VOLUME 4, NUMBER 3 MARCH 1955

Battelle Technical Review

IN THIS ISSUE:

Improving Natural Fibers

PHYSICAL SCIENTIST

DR. HUGO THIEMANN

"Every research problem, of course, can be approached in two ways—the theoretical and the experimental. The theoretical is the more versatile approach since it permits technologists to consider known data in the greatest number of possible combinations that might lead to solutions. By using our theoretical knowledge to the maximum, we can lay out the soundest plan of attack upon a problem. Then, subsequent experimentation can lead more quickly to useful results."

This philosophy of research is expressed by Dr. Hugo Thiemann, who is responsible for the technical management of Battelle's laboratories in Switzerland and directs the investigations of the physics and electronics division in that research center. Before he joined Battelle in 1953, Dr. Thiemann (Hugo, to his colleagues) had collaborated with the late Professor Dr. F. Fischer—chief of the Institute of Applied Physics of the Swiss Federal Institute of Technology in Zurich. After the professor's death, he carried to completion the new large-screen television projection system on which they had been working. The system, which can project pictures in color also, received a successful tryout in New York in 1952 and has been exclusively licensed to an American firm.

Recognized as a leading Swiss authority on television, the energetic Dr. Thiemann has carried on studies in the fields of electro-dynamics, hydro-dynamics, high-vacuum techniques, optics, electron optics, high-frequency techniques, and high-precision electronic circuitry. In addition, he currently is interested in problems in solid-state physics, metallurgy, microscopy, and engineering physics.

He received his diploma in electrical engineering and in physics from the Federal Institute of Technology. His doctorate was granted in 1947 by the same institution, while he was working on the television projection system.

Complementing his many professional responsibilities, are those of a father of two children. His recreational activities, now often neglected, include the typically Swiss sports of skiing, mountain climbing, and hiking.

March 1955
Volume 4, Number 3

BATTELLE TECHNICAL REVIEW

Dedicated to the dissemination of knowledge. Published monthly by Battelle Memorial Institute, an endowed foundation serving mankind through science and technology.

Published monthly by Battelle Memorial Institute. Please address all correspondence about articles, abstracts, subscriptions and exchanges to: The Editor, Battelle Technical Review, Battelle Memorial Institute, 505 King Avenue, Columbus 1, Ohio. Acceptance under 39-C. F. R. 34.64 (e). Printed in the U. S. A.

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Services That Enrich

TECHNICAL SOCIETIES ARE SO much a part of our technological culture that they are sometimes taken for granted. People know that technical societies perform worth-while services, yet the public at large has but a vague idea of what these services are. Even scientists and engineers may have limited perspective on the roles of technical societies in furthering scientific and industrial progress.

The main objective of the technical society is usually to promote the field of science, technology, or engineering with which it is associated. This is accomplished through the sponsorship of publications, meetings, lectures, symposia, expositions, awards, and group attack on technical problems. Other objectives are the furthering of recognition of the professional status of members, the encouragement of industry in the area of technical endeavor, and the formulation of engineering standards.

In pursuing their various objectives, technical societies perform many notable services that enrich science, industry, and the general public welfare. They are valuable adjuncts to our universities and technical schools in educating young people in science and engineering. Through their publications, symposia, and lectures, they also keep professional scientists and engineers informed and up to date in their technical knowledge. Thus, they are, in a sense, universities in which their members matriculate for a lifetime of study and instruction.

Technical societies, by providing platforms on which ideas are discussed and weighed, are safeguards for truth and scientific integrity. They keep technical people from veering off the path, and they are bulwarks against external threats to scientific thinking and procedure. At the same time, technical organizations serve as focal points around which schools of new thought can rally and find expression. These schools of thought, just as those of artists and musicians, stimulate creativity.

Technical societies encourage a fraternal type of spirit among members. This feeling of kinship facilitates the interchange of ideas and provides the underlying foundation for fruitful friendships and constructive competition. Unanimity in the devotion of technical people to great public causes is frequently solidified at the annual meetings of technical societies.

And, of course, technical societies are a boon to research. Their mechanisms for communication are the traditional mechanisms used by research people for the interchange of knowledge. Their publications are records of research experience, effort, and thought. The abstract services, bibliographies, and indexes they provide are tools used in nearly all creative investigations. The studies sponsored directly by technical society committees fill important gaps in knowledge and hasten the application of science to the solution of human problems. Without these services, research could not possibly have made the great contribution to human welfare it has in recent decades.

Clyde Williams

President and Director, Battelle Memorial Institute

GROUNDBREAKING

Battelle broke ground January 26 for one of the world's first centers for atomic research for peacetime industry. Dr. Clyde Williams, the Institute's president and director, is shown wielding the shovel. Other Battelle men present included, left to right, Richard J. Anderson, Dr. B. D. Thomas, Dr. H. W. Russell, M. R. Nestor, Gerald B. Fenton (trustee), G. D. Calkins, Dr. Sherwood L. Fawcett, Dr. H. R. Nelson (who will be in charge of research at the new center), Robert R. Adams, Williams, W. A. Welcker, Jr., and John S. Crout.

Improving Natural Fibers

By adding desirable qualities and correcting undesirable ones, chemistry can improve the economic future of cotton and wool.

by LAWRENCE C. LEATHERLAND

THROUGHTOUT THE HISTORY OF MAN and until recent times, textile fabrics have been made of natural fibers. Chief of these fibers were cotton and wool. The first successful artificial fibrous materials were viscose rayon and cellulose acetate, and these could be called modified forms of natural materials.

During the past 15 or 20 years, technologists have created a number of textile materials from nonfibrous sources. These new materials have many properties quite different from those of the natural fibers—properties that satisfy certain needs of consumers. For example, clothing that can be washed and dried easily helps the traveller to reduce the baggage he must carry. Wrinkle resistance gives us "freshly pressed" suits after one night's hanging in a closet. Increased abrasion resistance gives longer life to fabrics in critical uses. Reduced shrinkage gives better fitting clothes without the necessity of preshrinking them. These, and other features of the synthetic fibers have made a real contribution to the material progress of man.

However, the blessings have been mixed with real problems. With the new materials came increased electrostatic charges resulting from friction on the fibers, dyeing problems, discoloration, undesirably smooth and shiny surfaces, reduced water absorbency, and the appearance of small fibrous balls or "pills" on the fabric surface. The manufacturers of these man-made textiles are attempting to overcome all of these disadvantages, and improvements may be expected.

As we learn to make the best uses of the good qualities of the new fibers, they will contribute more and more to our lives. Nevertheless, for many purposes, the natural fibers are still preferred. Will it be possible to retain the desirable properties of the natural fibers, add many of the desirable properties of the synthetic, and yet not add undesirable properties? Farsighted leaders in the fields of natural fibers are convinced this can be done.

The following are some of the tendencies of cotton and wool in which improvements would be desirable:

Cotton

Shrinkage	Microbiological degradation
Flammability	Acid degradation
Wrinkling	Lack of water repellency
Soiling	Slow drying
Staining	Dyeing limitations
Degradation by heat	

Wool

Shrinkage	Chemical degradation
Soiling	Degradation by moths
Staining	Slow drying

Since joining Battelle in 1952, Lawrence Leatherland has investigated the finishing of wool, cotton, and synthetic textiles and carried on studies relating to textile chemicals. Previously, he served as general superintendent of the chemical division of the Virginia-Carolina Chemical Corporation. Earlier, as directing head of the engineering departments of the Institute of Textile Technology, he supervised important investigations that contributed to basic knowledge of the effects of fabric construction on the filtration of liquids.

SOME FIBER IMPROVEMENTS

Considerable progress has been made in correcting many of the characteristics of cotton. For example, the problem of cotton shrinkage has been reduced by the well-known "Sanforizing" process. Since this is a preshrinking operation and involves a loss of yardage of the cloth, however, the process leaves some-

thing to be desired. Successful use of certain resins for stabilizing some viscose rayon fabrics suggests a method not only for controlling cotton shrinkage without loss of yardage, but for improving resistance to wrinkling as well. Though the use of resins usually weakens the cotton fabric, more recent studies indicate that methods might be developed for applying resin to cotton fabrics without seriously affecting their strength.

The problems of achieving water repellency and resistance to soiling in cotton fabrics may be solved by chemical means. According to recent reports, a chemical treatment has been discovered which may increase the resistance of natural fibers to both water- and oil-borne soil. Moreover, investigations have shown that methods for improving the water repellency of cotton may also increase its resistance to water-borne soil.

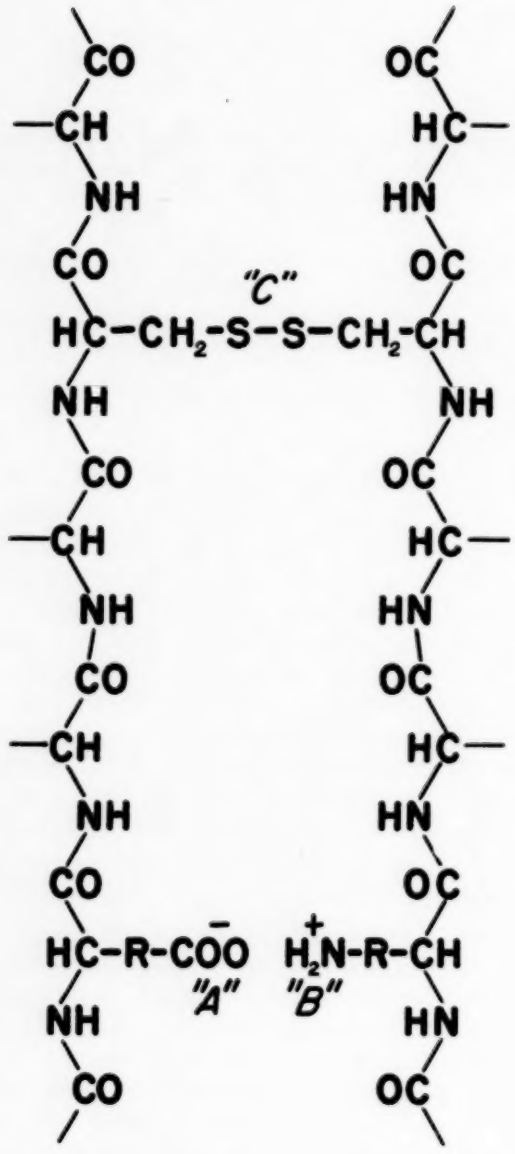
Really satisfactory and universally successful processes for making cotton flame resistant are not yet available. It is true that cotton flammability has been reduced in some cases, but so little is yet known about the subject that there is not even general agreement on methods of determining degree of flammability.

Industrial chemical research on wool has been concerned primarily with reducing wool's shrinkage and increasing its resistance to moth attack. Shrinkage control has been achieved by treatment with alkaline hypochlorites, alcoholic potassium hydroxide, and several resins. It is believed that such treatments smooth the scales on the wool fibers by either eroding the scale edges or filling them as a crack in wood is filled. Satisfactory washability has been obtained with these processes. Although the washing methods were developed primarily for military purposes, they may be adaptable to civilian fabrics.

Although moth resistance can be obtained by treatment with any one of a dozen or more chemical compounds, the treatments are often temporary. However, a few of these compounds become so tightly attached to wool that they resist washing and dry cleaning; as little as 2 or 3 per cent weight increase often gives adequate protection. The well-known DDT has been reported to be effective at even lower weight increase, but it has a tendency to wash out.

Modification of Fibers by Chemical Agents

Improvements in natural fibers by use of chemical agents may be achieved by three mechanisms: (1) physical impregnation, (2) physical modification by chemical means, and (3) chemical reaction with the fiber. The application of resins to cotton or wool is primarily a physical impregnation. Stabilization of wool by chlorination is an example of physical modification by chemical means, in that the effect seems to be a chemical "corrosion" of the scales of the wool fibers. The "permanent" types of water-repellent processes for cotton are believed to embody some chemical reaction with the fiber, as an example of the third mechanism.



The chemical structure of a portion of the wool chain, showing the reactive groups (A,B,C). These groups can be chemically modified and retained in the wool structure.

The natural question to ask is, "Are chemical reactions with the fibers desirable or not?" Perhaps an answer to this question may be found by investigating the properties of fabrics modified by the other mechanisms. Physical modification by chemical means, with

removal of the chemical from the fabric during processing, has been successful in chlorination of wool, mercerization of cotton, and sulfuric acid processing of cotton. So far, this mechanism has had limited use. The application of resins, or other impregnating agents, has often failed to give the desired durability in the improvements obtained. The impregnating agents are sometimes removed during laundering or dry cleaning. On the other hand, if the impregnating agent can be bonded tightly to the fiber, the fabric improvement should be more durable. Chemical bonds, in this case, should be stronger than physical bonds. If chemical bonds can be established, without undesirable changes in the fiber taking place, they should be valuable.

The Southern Regional Research Laboratory of the United States Department of Agriculture has been working on the basis of this belief for several years. Its work has resulted in the development of a number of chemically modified cottons. It was found that: acetylation of cotton increased its resistance to heat and rotting; carboxymethylation increased the water absorbency and degree of swelling of the wet fibers; phosphorylation produced a fibrous sheet of ion-exchange material; and aminization made it more receptive to a wider range of dyes. During the past two years, the Institute of Textile Technology has developed cyanoethylated cotton, with increased rot resistance and generally improved dyeability. The chemical nature of this product indicates that it can be modified further.

In wool research, Milton Harris and his associates in this country, and J. B. Speakman and his associates in England, have obtained improvements in stability and chemical resistance by reactions between wool and such chemical compounds as ethylene dibromide and certain diepoxides. Other workers have also made contributions in this field.

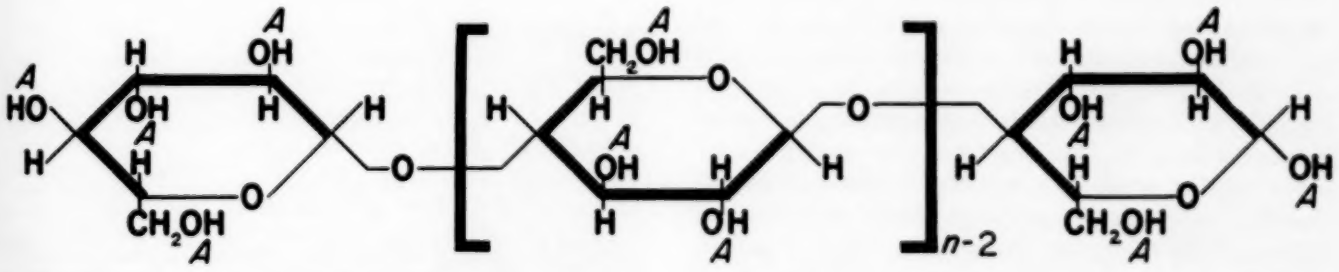
It can be said that many of these chemically modified fabrics have some undesirable properties. At the same time, there can be no question that there are enormous potentialities in this approach to an old problem. Many failures are to be expected, yet the possible rewards of success certainly make intensive study of chemical modification worth while.

Basis for Chemical Changes in Natural Fibers

Chemical modification of cotton and wool requires knowledge of their chemical natures. Cotton is composed of chains of cellulose formed of glucose units. The illustration on this page shows one of these structural chains. Most of the desirable properties of cotton depend upon the preservation of these chains. Therefore, reactions with cellulose are limited to reactions with the hydroxyl groups of each glucose unit (marked "A" in the illustration).

The structure of wool is more complex than that of cotton, and it has not been as completely identified. However, there are apparently three possible reactive groups in wool. The illustration on page 26 represents part of the wool structure as it is now generally believed to exist. The reactive groups are marked "A", "B", and "C". The two sulfur atoms in group "C" can be parted and new structures built by insertion of new chemical groups between the atoms. Under certain conditions, adjacent "A" and "B" groups are joined. They, too, can be parted and then modified.

A great many chemical reactions can be conducted with the reactive groups found in cotton and wool. Often, the reactions will improve the fibers and make them more valuable. A change obtained by means of a chemical bond should be more durable than one obtained by means of physical impregnation. Combinations of improvements from such chemical modifications will bring desirable changes while preserving the present good qualities of these fibers. The rewards of success will go to those who have vision and faith in the future of the natural fibers.



The chemical structure of the cellulose chain, showing reactive groups (A), where most chemical modifications occur.

Appraisal--Step to Area Health

Through objective appraisal of the assets and liabilities of their geographic area, people can correct conditions impeding or threatening their progress.

by Robert E. Holmes

In the years since 1929, people of many areas in the United States, as well as in other parts of the world, have become aware that they must take steps to solve their economic and social problems. The last quarter century has seen the complacency of older industrial regions and established industrial groups disturbed by competition from more aggressive areas and groups. In some cases, growth by unwise exploitation of resources or people has been halted by growing social consciousness and by governmental action. And in many instances, areas have found their economic foundations shaken by subtle or sudden technological changes. These changes have aroused interest in preventive, as well as corrective, "medicine" to improve the economic and social health of threatened geographic areas.

Various measures and activities are being undertaken to bolster morale and to improve purchasing power in distressed areas and also to prevent possible or imminent distress in threatened areas. Some of the bolstering activities are planned and carried on by industrial development departments of individual companies such as railroads and utilities; some are carried on by chambers of commerce at municipal, state, and national levels; and others are pursued by a variety of civic, political, and industrial combinations known as industrial development councils, companies, committees, associations, and clinics.

Quite understandably, each of these groups has followed a course that is governed primarily by the immediate, and perhaps most important, interest of the individual group involved. A railroad or utility, for example, would strive to help an industry locate within its service area and to encourage new industries to move to that area. The same ends are sought by chambers of commerce and community development councils. On the other hand, the larger regional groups, made up of competitive entities, are more likely to present a united front and cooperate, as far as they feel possible, in an effort to improve the overall regional situation. In any case, experience has shown that the ideal approach to the solution of area problems is a careful and objective appraisal of the factors influencing the economic and sociological health of the area.

Factors in Area Appraisal

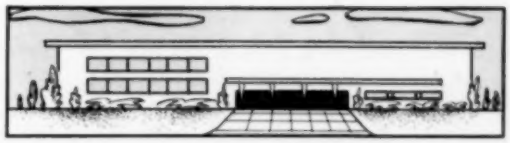
In many cases, such developmental groups fail to make use of the best tools available to them. Much of their promotional effort—too much at times—is likely to be confined to the dissemination of eye-appealing advertising doctored up with a large dose of emotional fervor. By failing to make adequate use of even the most readily available economic facts about their region, the groups concerned may doom their efforts to failure.

It is unlikely that any populated area is completely devoid of economic usefulness. Any past industrial or agricultural operations were certainly based upon some resources that are or were available. Therefore, there is a good likelihood that a more thorough economic appraisal or reappraisal could discover new and added usefulness in what the region has to offer that would benefit its inhabitants.

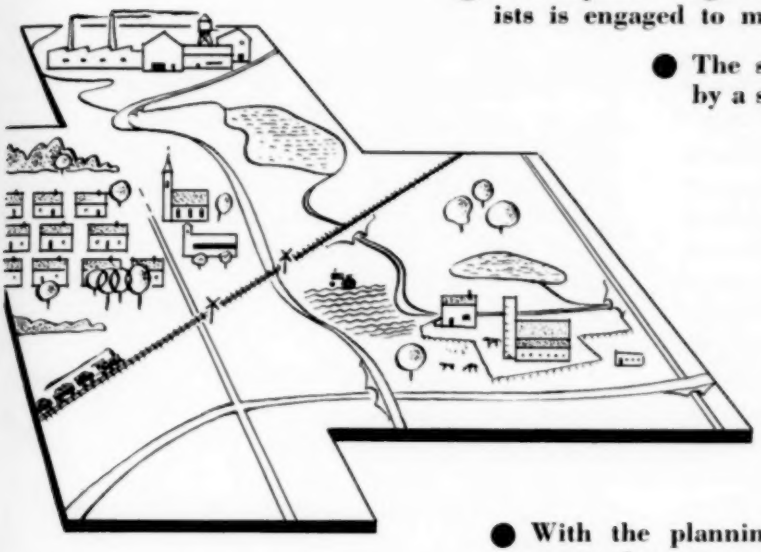
Robert Holmes, as a member of Battelle's engineering economics division since 1951, has participated in and guided appraisals and market surveys as well as studies involving production planning, product diversification, and raw materials availability. A graduate of Wesleyan University, he had previously served as export manager and sales technical adviser for Monsanto Chemical Company, a position which enabled him to become acquainted with problems encountered by the major process industries.

STEPS IN AREA EVALUATION

- **An area becomes aware of its problems and desires to do something about them.**
- **A group is formed to plan the steps needed to help the area.**



- **A competent organization or group of specialists is engaged to make a thorough evaluation.**
- **The study is carried on by a special team which:**
  - ***Surveys pertinent aspects of the area's economic life***
  - ***Studies the area's economic relationship with the whole economy***
  - ***Studies the area's most promising potentials***
  - ***Evaluates all information and recommends steps for area adjustment***



- **With the planning group leading, the area implements those steps recommended for immediate action.**
- **Long-term plans are made to solve continuing problems.**

- **Additional help and advice may be sought from the experts when needed.**

New England is proving this point with its development of such entirely new fields of industrial activity as electronics to replace the textile and other industries that have moved to and found, perhaps, better economic environment in other regions. The Scranton-Wilkes-Barre area of Pennsylvania has been proving the point in the strong industrial development that followed the demise of the area's coal industry. Areas of the South are beginning to show new strength after an appraisal of their economic needs and opportunities. As a result, they are establishing new industries in regions that had faced economic ruin when agricultural staples were their only resource.

Factors in Adequate Appraisal

While recognizing the success of these and other developmental programs, the fact still remains that in many programs the economic appraisal is inadequate. A thorough analysis of an area takes into account all known data on resources, labor, transportation facilities, community attitudes, climate, topography, and water supplies. It determines whether available facts are adequate and accurate; and it provides for corrections and additions to available data, if necessary. A proper appraisal interprets these data in relation to existing industries and to the welfare of the area; it also interprets the data in terms of the relationship of the area with other areas. Defining the apparent limitations of the area in renewing former, or developing new, industrial or agricultural activities, should also be part of an appraisal.

Such a study as has been described cannot be considered complete without the recommendation of a course of action. The program should point out immediate action that might be taken to alleviate the problems facing the area; it should suggest possible steps for removing or altering limitations that can be

changed; and, finally, such a program should lay down a long-range program for research, education, and other improvements that may be needed.

The items "labor" and "community attitudes" included in the foregoing paragraph are not, obviously, wholly subject to economic appraisal. Rather, they include sociological factors that could, for a time at least, comprise hurdles that might impede an area's progress in spite of advantages or opportunities suggested by appraisal of the more completely economic factors. As a matter of fact, no area appraisal can be conducted practically along economic or sociological lines alone. A sociological study would tend to come up with the recommendation that the area needs an industry that would put people to work, since a narrow "welfare" viewpoint is typically concerned with the needs for funds to overcome social, educational, and spiritual shortcomings.

An economic study alone might deal too strongly in terms of "input-output" balance of industrial and agricultural products, transportation facilities, markets, and labor supply. Those organizations having the greatest experience in area studies have learned to include as much analysis as possible of the sociological aspects while making an economic appraisal. While being able to recognize the sociological weaknesses of an area is one of the most important phases of an economic study, the possible remedy and the corrective action are best left to those experienced in industrial relations and spiritual leadership.

An effective team of specialists in area-economic appraisal should comprise experts in industrial, agricultural, and commercial economics, preferably with some experience in social economics. Since most economists who deal with industrial problems today are extremely conscious of human relations, familiarity with many aspects of social economics has become a "built-in" characteristic of the better area appraisers. It is to be expected that the economic team will call upon sociological leaders within an area for essential details of possible social significance to the over-all appraisal.

Symptoms of Trouble

As has been suggested above, an area can be in one of several "conditions"—from apparently very healthy to deathly sick—and these are symptoms that call for diagnosis. While a hypochondriac can easily make himself unnecessarily ill or spend his money on needless diagnosis and even "quack" remedies, there is virtue in even the healthiest of persons keeping a check on his condition as insurance against future trouble. Of course, the really sick patient needs treatment. He should be treated for the ailment, but his convalescence should include improvement in environment and elimination of possible causes for relapse.

An area can tell a great deal about its own conditions by the similarity of symptoms that led to trouble in other areas. The more obvious symptoms are excessive unemployment, exodus of industries, a serious drop in retail sales, unsalable agricultural products, emigration of workers, greater employment of women than men, deterioration of school, church, and civic facilities, and recurrent crises in water supply and sewage disposal. Attempts to remedy one or more of these conditions without proper diagnosis could easily lead to wasted effort and throw added burdens on the area's economy.

Excessive unemployment could be a temporary situation, no worse in one area than another, or it could be a continuing condition peculiar to a specific area. Proper diagnosis would determine the exact nature of this unemployment and suggest remedies, if available.

Crises in water supply would be diagnosed to determine whether the situation were the result of faulty planning, political ineptness, unbalanced industrial demand, or serious local depletion of water reserves.

Expert Help Needed

In essence, one or more symptoms should prompt an area to seek expert analysis and advice. Sufficient funds should be made available to permit an adequate "check up" in addition to specific diagnosis of suspicious symptoms. By such a check up, unsuspected ills, perhaps more serious than the noted symptoms, would be uncovered. Finally, sober thought should be applied, after the diagnosis, to decide how much the area can afford to pay (even to the point of sacrifice) for whatever action might be needed to overcome the area's difficulties.

There are no limits to the size or geographical location of an area that can benefit from economic appraisal. The only restriction is in the willingness of an area to expose its soul to an unbiased, factual appraisal of its technological, economic, and sociological assets and liabilities.

Notes From Battelle

CREEP-RESISTANT ZIRCONIUM ALLOYS

THE HISTORY OF zirconium alloys is a short one, dating back only to 1949. Yet, in these few years, technologists have been successful in developing a number of useful, high-strength alloys.

Various zirconium alloy systems have been investigated recently at Battelle to discover the effect of alloying elements upon the tensile, creep, and hardness properties of zirconium. Walston Chubb reports that the alloy systems were screened to find the alloying elements that produced the greatest strengthening effect. The mechanical properties of binary alloys were measured at room temperature, 260 C, and 500 C.

The investigations disclose that certain of the "eutectoid-type" alloying elements—those which tend to lower the transformation temperature of zirconium —are very effective in strengthening zirconium at temperatures below 500 C. Molydenum, niobium, tantalum, and vanadium are such elements. "Peritectoid-type" elements, such as tin and aluminum, on the other hand, raise the transformation temperature. These elements are most effective in strengthening zirconium at 500 C and above, and are most useful in improving creep strength at 500 C.

Ternary zirconium alloys, containing both "peritectoid-" and "eutectoid-type" elements, have a wider range of mechanical properties. Such alloys are easily hot fabricated, show good strength and ductility at room temperatures, and are promising as creep-resistant alloys at 500 C.

LARGE COBALT-60 SOURCE

RADIOISOTOPES, BY-PRODUCTS of nuclear reactors, have opened new vistas of research in many areas. Of the available radioisotopes, the powerful gamma-radiation source, cobalt-60, is one of the more versatile and is adaptable to a wide variety of studies. It can be used to improve processing techniques, to develop new materials not available by other methods, and to sterilize various types of products.

One of the Nation's largest cobalt-60 sources has just been installed at Battelle as part of its expanded nuclear research program. Currently, the source consists of 2000 curies of the isotope, the equivalent in radioactivity of 24 million dollars worth of radium. However, G. D. Calkins, who is in charge of the Institute's radioisotope and radiation research, reports that the housing for the installation (see inside back cover) has a planned capacity for 10,000 curies.

The new installation can be used in a wide variety of investigations. Recent studies, for example, have shown that gamma radiation provides a method of initiating the chlorination of such materials as toluene and xylene. Chlorinated toluene and xylene are used in the making of insecticides, perfumes, pharmaceuticals, dyes, and other products. Other research has indicated that a wide variety of organic materials may be polymerized with radiation, and that entirely new plastics may be produced through radiation-activated reactions. Still another interesting effect of radiation on organic materials like plastics and rubber is the production of cross linkages between the large chain-like molecules. In the case of plastics, softening temperatures are markedly increased, and solubility in organic solvents decreased, by exposure to radiation.

The cobalt-60 source is expected to play an important part in furthering progress in the radiation sterilization of certain foods, drugs, and medical supplies that are difficult, too costly, or impossible to sterilize by conventional methods.

The new facility may also be used to study the effects of radiation on electronic components, lubricants, and engineering construction materials. The results of such studies could lead to the development of more radiation-resistant materials for parts of tomorrow's nuclear-powered air, sea, and land craft.

ULTIMA THULE ON THE MAINLINE

IN THE DAYS OF THE ancient Romans, "Ultima Thule" was the name given to Iceland. The words themselves suggested that the island was on the extreme edge of the earth's habitable area. Today, however, the island lies along one of the main air pathways between the United States and northern Europe and has prospects of becoming one of the world's more prosperous nations. Iceland is primarily a nation of farmers and fisherfolk, with minor home industries. At the same time, its natural resources could offer the

people better opportunities as workers in modern industrial plants.

A Battelle survey of Iceland's resources has shown that an industrial economy is feasible with the aid of research and adequate capital. The island possesses potential water power for generating about four million kw—only 100,000 kw is now installed. Terrestrial heat, in the form of natural steam and hot water from springs and wells, is used for heating many homes. Among the available minerals are perlite; clays (limonitic, halloysitic, and anorthositic—these eventually may be useful for producing aluminum); peat and lignite; diatomaceous earths; fine white silica; and limestone in the form of fossil shells (about to be used in the production of cement.)

Dr. Bruce Gonser, Institute technical director, is certain that a large chemical industry is a good possibility. He points out that with electric power and natural steam available, salt, caustic, and chlorine could be produced from sea water at low cost. An ammonium nitrate plant is already in operation. The larger power potential may also be used to produce magnesium from sea water and aluminum from imported alumina.

Because of the island's location, raw materials could be shipped to, and semifinished materials from, the ice-free harbors at relatively low cost. Moreover, Iceland is easily accessible to markets on both sides of the ocean, thus giving it a naturally advantageous location as an industrial nation.

EUROPEAN CERAMIC INDUSTRY

THE EFFICIENCY OF THE European ceramics industry varies widely, not only from country to country, but within countries as well, according to John D. Sullivan, technical director at Battelle. Speaking before a meeting of the Ohio Ceramic Industries Association, he pointed out that while in most countries the knowledge is available for improving production, the low cost of manpower tends to discourage the building of more mechanized plants.

Thus, in Italy, working men carry clay in baskets in some plants, while in other ceramic plants modern tunnel kilns are used. In Britain, some ceramic plants are equal to the best in the United States. At the same time, potteries are still operating in Northern Ireland where artisans use older methods of production, priding themselves on quality and giving less heed to the cost of production.

Wages in European countries tend to be lower than in the United States. Thus, average hourly rates for 1950 in the ceramic and allied industries for Great Britain were $0.44; for Western Germany, $0.32; and for Italy, $0.21. However, payroll taxes are very heavy, often totaling over 40 per cent of the wages.

Sullivan concluded that countries with low labor costs do not necessarily have an advantage in international trade. He pointed out that unit-labor costs govern the flow of trade. Hence, low-paid labor cannot undersell high-paid labor when the increased productivity of the latter offsets the wage scales. For this reason, countries with mechanized industries, paying higher wages, can compete with countries where mechanization is less complete and wages lower.

HIGH-SPEED SWITCH

IN THIS AGE OF SPEED, even electric switches must be fast. One answer to this need has been provided at Battelle, with the development of a high-speed, multiple-contact, low-signal-level, rotary switch for the U. S. Signal Corps. It is designed to operate at speeds heretofore unobtainable in low-level switches —6000 rpm and 10,000 contact closures per second. It also operates quietly with a noise level only one-tenth to one-hundredth of that found in previously available switches.

Alexander Finlay, Jr., of Battelle's electrical engineering division, describes the operation of the new switch as follows: A small centrifugal pump pulls mercury from a reservoir and forces it from a spinning nozzle. The ejected stream strikes the inside of a thin cylinder of metal at high velocity, causing a travelling deformation in the metal. The deformation makes contact with successive switch elements behind the metal cylinder.

Switches of this type have many possible uses in the laboratory. For example, they can help monitor a large number of temperatures by the simple expedient of successively connecting many thermocouples to a single lead. The temperatures can then be read on a cathode-ray oscilloscope as the succeeding contacts are made. Such switches can also be used to generate functions for analog computers and other equipment.

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Francis W. Boulger and Robert H. Frazier, both of Battelle, have been selected as winners of the 1955 Robert V. Hunt Award for their paper on "Influence of Carbon and Manganese on the Properties of Semi-killed Hot-Rolled Steel". The Award is presented annually by the American Institute of Mining and Metallurgical Engineers to authors of each year's best paper on iron and steel.

Writings by Staff Members*

Foundry Manual for Sand Casting Aluminum—10 Per Cent Magnesium Alloy. Battelle Memorial Institute. Frankford Arsenal. 1954.

Purpose of the manual is to encourage and assist aluminum foundries to produce castings of the aluminum–10 per cent magnesium composition, generally called 220-alloy. It presents techniques and precautions to be observed to assure the production of sound castings.

The Sensitometry of Continuous-Tone Xerography. W. E. Bixby, P. G. Andrus, and L. E. Walkup. *Photographic Engineering*, vol. 5, no. 3, 1954, pp. 195-201.

Discusses the factors involved in producing continuous-tone xerographic images. Describes the importance of the electrical characteristics of the plates and powders, the opacity of the powders, and the materials used in transferring and fixing the image.

Transducers for Measuring Displacement, Velocity, or Acceleration. Robert M. Conklin and Hal M. Morgan. *Product Engineering, December*, 1954, pp. 156-162.

Discusses the factors to be considered in selecting motion-measuring transducers and describes the characteristics of several of the most widely used types.

A Machine System for Accepting, Storing, and Searching Engineering Data on Electronic Components. Roy A. Corby, Harold J. Behm, and Alvin T. Maierson, editors. *WADC Technical Report 54-151*. U. S. Department of Commerce, Office of Technical Services, 1954.

Describes a semiautomatic system for handling engineering data that can be used to facilitate the selection of electronic components by designers and engineers.

Alloys and Their Properties for Elevated-Temperature Service. Howard C. Cross and Ward F. Simmons. Paper in *Utilization of Heat-Resistant Alloys*, pp. 55-96. American Society for Metals. 1954.

This paper is essentially a summary of the high-temperature properties of metals from 300 to 2000 F. The light alloys (magnesium, aluminum, and titanium), ferritic and austenitic steels, the super-alloys, cermets, and molybdenum alloys are discussed.

◇

Members of the Battelle staff are authors of the recently published articles and books listed on this page. In most cases, reprints are available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.

Nickel in Iron and Steel. A. M. Hall. John Wiley & Sons. New York, 1954.

Reviews and correlates published data concerning the occurrence and refining of nickel and the production and properties of irons and steels containing nickel and discusses the applications of nickel containing steels and irons.

Instrument Society of America, Proceedings, vol. 8, 1953 contains these papers by Battelle staff members:

Functional Design Consideratons for an Inexpensive Analog Computer. William Hecox, Robert E. Martin, and Bernard H. List. pp. 234-237.

Presents the design requirements for electronic differential analyzers for ease of setting up problems, versatility, and ease of maintenance. Discusses factors affecting accuracy of problem solutions and their relation to computer costs, and describes special features of a 21-amplifier computer constructed at Battelle.

Instrumentation for Statistical Quality Control. William Hecox and Roger L. Merrill. pp. 1-4.

Describes the nature of product variation in high-speed production lines and the use of statistical quality control charts for variables. Also discusses the operation of an averager and range computer and their uses in control and indicating systems.

Quality of Research. C. F. Lucks. p. 264.

Discusses the importance of proper and accurate instruments in research activities and the requirements of an instrument pool or laboratory for supplying needed instruments.

Steel-Container Treatments. II. L. J. Nowacki, E. R. Mueller, and R. H. Dent. *Modern Packaging*, December, 1954, pp. 145-148.

Describes how metal surface conditions affect the adhesion and chemical resistance of organic coatings used as linings of steel shipping containers, and the effect of phosphate treatments on decreasing rusting in unlined containers.

Constant and Cyclic-Load Creep Tests of Several Materials. Ward F. Simmons and Howard C. Cross. Paper in *Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures*, ASTM Special Technical Publication, No. 165, pp. 149-161. American Society for Testing Materials. Philadelphia, 1954.

This limited investigation indicated that alternate periods of load and rest had the same effect as continuous loading on the deformation characteristics of metals at elevated temperatures. Aluminum, ferritic steel, and austenitic steel sheet were used in this investigation.

ABSTRACT INDEX

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BATTELLE TECHNICAL REVIEW ABSTRACTS

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***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

3176 Design and Operation of Intermittent Supersonic Wind Tunnels. A. Ferri and S. M. Bogdonoff. *AGARDograph*, no. 1, May 1954, 108 p. (TL565 Ag11g)

Particular attention directed to the blow-down type wind tunnel with consideration given to low cost and flexibility. Calculation and experience related to component performance. Typical construction, test set-up, instrumentation, and extension to the transonic and hypersonic region. Diagrams, graphs, photograph. 57 ref.

3177 The Spinning of Modern Aircraft. T. H. Kerr. *Aircraft Engineering*, v. 26, Nov. 1954, p. 370-377.

Nature of spinning; methods of recovery; escape from spinning aircraft. Diagrams, graphs, tables, photographs.

3178 High Offset Flapping Pin Rotor Analysis. P. R. Payne. *Aircraft Engineering*, v. 26, Nov. 1954, p. 378-382.

Theory of helicopter rotor dynamics. Diagrams, graphs.

3179 Wings Under Repeated Thermal Stress. E. W. Parkes. *Aircraft Engineering*, v. 26, Dec. 1954, p. 402-406.

Permanent elasticity, shakedown, alternate plasticity, and incremental collapse in wings subjected to a number of thermal cycles. Diagrams, tables, graph. 4 ref.

3180 The Shock-Wave Cubic. V. D. Naylor. *Aircraft Engineering*, v. 26, Dec. 1954, p. 407-409.

Equation which permits solution of shock-wave problems without tables. Diagrams.

3181 Guided Missiles. The Ground-to-Air Weapon. G. W. H. Gardner. *Engineering*, v. 178, Nov. 26, 1954, p. 692-694.

Technical problems of design; principles of guidance; effects of kinematics and aerodynamic heating; types of engines; performance and control. Photographs, diagrams, graph, table.

3182 Propellers for High-Speed Aircraft. G. C. I. Gardiner and P. Brett. *Royal Aeronautical Society, Journal*, v. 58, Dec. 1954, p. 799-807.

An examination of current propeller theory and practice to cover the range of speeds between 450 and 550 m.p.h. Graphs, diagrams.

3183 On a Minimum Time Flight Path With Regard to Stress and Heat Limitations. Hermann Behrbohm. *SAAB Aircraft Company, Technical Notes, SAAB TN* 26, 1954, 26 p. (TL504 Sv23+)

Mathematical analysis. Graphs, diagrams.

3184* The Jet Helicopter. Basil Arkell. *Shell Aviation News*, 1954, no. 196, Oct., p. 4-8.

Development of rotor and engine systems. Photographs.

3185 A Vector Study of Linearized Supersonic Flow Applications to Nonplanar Problems. John C. Martin. *U. S. National Advisory Committee for Aeronautics, Report* 1143, 1953, 34 p. (TL521 Un3r)

Study of the partial-differential equation of steady linearized supersonic flow. Tables, graphs, diagrams. 15 ref.

3186 On Transonic Flow Past a Wave-Shaped Wall. Carl Kaplan. *U. S. National Advisory Committee for Aeronautics, Report* 1149, 1953, 12 p. (TL521 Un3r)

Mathematical analysis. Tables, graph, diagram.

3187 The Effects of Dynamic Lateral Stability and Control of Large Artificial Variations in the Rotary Stability Derivatives. Robert O. Schade and James L. Hassell, Jr. *U. S. National Advisory Committeee for Aeronautics, Report* 1151, 1953, 24 p. (TL521 Un3r)

Free-flight wind-tunnel testing of a 45° sweptback-wing airplane model. Graphs, diagrams, tables, photograph. 12 ref.

3188 Impingement of Water Droplets on Wedges and Double-Wedge Airfoils at Supersonic Speeds. John S. Serafini. *U. S. National Advisory Committee for Aeronautics, Report* 1159, 1954, 24 p. (TL521 Un3r)

An analytical solution is presented for the equations of motion of water droplets impinging on a wedge in a two-dimensional supersonic flow field with an attached shock wave. Graphs, tables, diagrams. 10 ref.

3189 Average Skin-Friction Drag Coefficients From Tank Tests of a Parabolic Body of Revolution (NACA RM-10). Elmo J. Mottard and J. Dan Loposer. *U. S. National Advisory Committee for Aeronautics, Report* 1161, 1954, 7 p. (TL521 Un3r)

Apparatus and procedure for obtaining coefficients from boundary-layer total-pressure measurements in water at Reynolds numbers 4.4×10^6 to 70×10^6. Photographs, diagrams, tables, graphs. 5 ref.

3190 On the Analysis of Linear and Nonlinear Dynamical Systems From Transient-Response Data. Marvin Shinbrot. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3288, Dec. 1954, 51 p. (TL570 Un3t)

Development of a general theory of the so-called "equations-of-motion" methods and applications. Tables, graphs. 10 ref.

3191 An Investigation of a Wing-Propeller Configuration Employing Large-Chord Plain Flaps and Large-Diameter Propellers for Low-Speed Flight and Vertical Take-Off. Richard E. Kuhn and John W. Draper. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3307, Dec. 1954, 94 p. (TL570 Un3t)

Apparatus and tests results. Graphs, diagrams, photographs. 4 ref.

3192 Theoretical and Experimental Investigation of Heat Transfer by Laminar Natural Convection Between Parallel Plates. A. F. Lietzke. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3328, Dec. 1954, 23 p. (TL570 Un3t)

Includes graphs, diagram. 6 ref.

3193 *University of Toronto, Institute of Aerophysics, UTIA Progress Reports*, 1953-1955, 105 p. (TL570 T64.84p)

Five papers on absorption and amplification of shock waves, hypersonics, boundary layers and heat transfer in supersonic flows, interferometric investigation of shock wave diffraction, interferograms, graphs, shock waves, diagrams.
and aerodynamic noise. Photographs, Schlieren photographs,

Aeronautical Engineering

3194* Singularities Process of Computing the Flow Around Moderately Thick Wings of Finite Span. **Singularitätenverfahren zur Berechnung der Strömung um mässig dicke Flügel endlicher Spannweite.** (German.) Friedrich Keune. *Zeitschrift für Flugwissenschaften*, v. 2, no. 10, Oct. 1954, p. 253-259.

Includes diagrams. 9 ref.

Books and Miscellaneous Publications

3195 High Speed Aerodynamics and Jet Propulsion. v. VI. General Theory of High Speed Aerodynamics. W. R. Sears, editor. 758 p. 1954. Princeton University Press, Princeton. (TL709 H53)

Theories and problems of application of subsonic, transonic, supersonic, and hypersonic flows; mathematical aspects of hyperbolic flow problems, the small perturbation concept and theory, potential flow theory based on hodograph method, methods of characteristics, and analysis of flows and shock waves; linearized supersonic theory, and use of higher approximations to augment first order theories.

3196 Handbook of Aeronautics, No. 1. Structural Principles and Data. 4th Ed. 322 p. 1952. Sir Isaac Pitman & Sons, London. (TL670 R81s4)

Loading systems and stresses and their relation to structural airworthiness; theory of structures in the design and analysis of stressed skin structures.

See also:
3685 (corrosion protection on aircraft)
3934 (performance of aero gas turbines)
4175 (structural analysis in aircraft)

AGRICULTURE

3197* Stemphylone, a Root-Killing Substance From *Stemphylium radicinum*. (English.) O. Rosenlund Hansen. *Acta Chemica Scandinavica*, v. 8, no. 8, 1954, p. 1332-1334.

Shows growth inhibition to seedlet roots of *Lepidium sativum*. Ultra-violet spectrogram. 2 ref.

3198 Ceramic Fertilizers. G. H. McIntyre. *American Ceramic Society Bulletin*, v. 33, Dec. 1954, p. 358-360.

Development of a frit to supply trace elements to the soil. Table.

3199 Furochromones and Coumarins. XI. The Molluscicidal Activity of Bergapten, Isopimpinillin and Xanthotoxin. Alexander Schönberg and Nazih Latif. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6208.

Suggests a systemic molluscicide. Table. 3 ref.

3200 The Absorption of Alkaline Earth Cations by Barley Roots: Kinetics and Mechanism. Emanuel Epstein and James E. Leggett. *American Journal of Botany*, v. 41, Dec. 1954, p. 785-791.

Describes absorption and mutual interference using Sr labeled with Sr^{89}, and distinguishes two modes of uptake. Graphs. 10 ref.

3201 Studies in the Physiology of Forest Trees. I. Physical Factors Affecting the Movement of Moisture. K. N. H. Greenidge. *American Journal of Botany*, v. 41, Dec. 1954, p. 807-811.

Concept of ready fracture is examined in light of several physical, structural, and technological factors affecting the movement of moisture in trees. 43 ref.

3202 Studies on Acetaldehyde Evolution and Utilization. James F. Nance and Yoshio Shigemura. *American Journal of Botany*, v. 41, Dec. 1954, p. 829-832.

Conditions responsible for evolution in plant tissues with emphasis on the mechanism of auxin action. Tables. 20 ref.

3203 The Sequence of Formation of Fatty Acids in Developing Soybean Seeds. R. O. Simmons and F. W. Quackenbush. *American Oil Chemists' Society, Journal*, v. 31, Nov. 1954, p. 441-443.

Selected cuttings were nurtured in a sucrose-C^{14} medium. Radioactivity was strongest in the oleic acid fraction of the oil. Table, graphs. 10 ref.

3204* The Effect of Certain Inorganic Salts on the Nitrification Rate of Two South Australian Soils. F. M. Collins. *Australian Journal of Agricultural Research*, v. 5, Oct. 1954, p. 688-701.

Results indicate that nitrification was suboptimal and that certain mixtures of $CaCO_3$, KH_2PO_4, and trace elements increased nitrification rate in both soils considerably. Graphs. 20 ref.

3205* The Errors Involved in pH Determination in Soils. M. Raupach. *Australian Journal of Agricultural Research*, v. 5, Oct. 1954, p. 716-729.

Causes of errors which may arise in the measuring system; errors in soil systems due to suspension effect and to lack of equilibrium between the soil and aqueous phases. Tables, graphs, diagram. 8 ref.

3206 Cyclethrin, a New Insecticide of the Pyrethrins-Type. Harry L. Haynes, Howard R. Guest, Harry A. Stansbury, Anthony A. Sousa, and Andrew J. Borash. *Boyce Thompson Institute, Contributions*, v. 18, Oct.-Dec. 1954, p. 1-16.

Brief description of certain insecticidal and chemical aspects. Tables, graph. 8 ref.

3207 Comparative Effect of Fungicides on Oxygen Uptake and Germination of Spores. S. E. A. McCallan, Lawrence P. Miller, and Richard M. Weed. *Boyce Thompson Institute, Contributions*, v. 18, Oct.-Dec. 1954, p. 39-68.

Contrasts relative sensitivity of O uptake and germination as measures of toxicity and demonstrates any patterns of uptake which might clarify the nature of fungicidal action. Tables, graphs. 27 ref.

3208 Joint Action of Binary Mixtures of Insecticides. Eleanor E. Storrs and H. P. Burchfield. *Boyce Thompson Institute, Contributions*, v. 18, Oct.-Dec. 1954, p. 69-78.

Study of DDT-methoxychlor and chlordan-heptachlor to determine whether they would act similarly when tested together, and independently when cross-tested. Investigates behaviors of mixtures of other insecticides. Graphs, table. 8 ref.

3209* Heat Treatment of Calcium Phosphates and Natural Apatitic Phosphates. **Sur le traitement thermiques des phosphates de calcium et des phosphates apatitiques naturels.** (French.) Félix Trombe and Marc Foex. *Bulletin de la société chimique de France*, 1954, no. 10, Oct., p. 1282-1287.

Effect of solar heating of natural phosphates on their assimilation by plants. Graphs, tables. 47 ref.

3210 Pesticides. How Formulation Problems Are Sloved. H. A. Pass and D. A. Pearce. *Canadian Chemical Processing*, v. 38, Dec. 1954, p. 54 + 7 pages.

Stresses importance of extensive field formulation studies prior to marketing. Photographs. 2 ref. (To be continued.)

3211* Phosphorus Content of Potato Plants in Relation to Yield and to Phosphorus Concentrations in Nutrient Solutions. H. Hill, A. B. Durkee, H. B. Heeney, and G. M. Ward. *Canadian Journal of Agricultural Science*, v. 34, Nov.-Dec. 1954, p. 644-650 + 1 plate.

Determines the particular plant part in which the P content was most closely related to P treatment and yield of tubers, and the critical levels of various P fractions. Tables, photograph. 8 ref.

3212 Fertilizer Industry in 1954. Edwin C. Kapusta. *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 109-111.

Liquid NH_3 fertilizers gained; but mixed fertilizers still holds ⅔ of the market; 1955 will be limited only by capacity. Tables, photograph.

3213 Pesticides in 1954. Lea S. Hitchner. *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 112-114.

Poor crop year (drougth) blighted domestic market. Tables.

3214 The Chemistry of Fungi. XXIII. Tumulosic Acid. L. A. Cort, R. M. Gascoigne, J. S. E. Holker, B. J. Ralph, Alexander Robertson, and J. J. H. Simes. *Chemical Society, Journal*, 1954, Nov., p. 3713-3721.

Chemistry of extracts from *Polyporus tumulosus* Cooke, *P. australiensis* Wakefield, or *Paria cocos* Wolf. 9 ref.

3215 The Partial Identification of *O*-Methyl Sugars Occurring in Soil Peat and Compost. Robert B. Duff. *Chemistry & Industry*, 1954, no. 49, Dec. 4, p. 1513.

Uses chromatography. 3 ref.

3216* Research on the Relationship Between the Chemical Structure and Phytocide Activity of Different Salts, Esters, and Other Derivatives of Monochloro Acetic Acid. **Recherches sur la relation entre la structure chimique et l'activité phytocide de différents sels, esters et autres dérivés de l'acide monochloracétique.** (French.) Pierre Poignant. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1408-1410.

Includes table. 3 ref.

3217* Role of Heteroauxine and Maleic Hydrazide in the Rhizogenesis of Carrot Root Tips. **Rôle de l'hétéroauxine et de l'hydrazide maléique dans la rhizogénèse des pointes de racines de Carotte.** (French.) Paul-Émile Pilet. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1412-1415.

The growth of carrot tip rootlets sectioned longitudinally, makes it possible to observe physiological antagonisms. Photograph, graph. 9 ref.

3218* Action of Sodium 2,4-Dichloro Phenoxy Acetate on the First Stages of Development of *Sphagnum papillosum* Lindb. **Action du 2.4-dichlorophénoxyacétate de sodium sur les premiers stades du développement de *Sphagnum papillosum* Lindb.** (French.) Lucie Kofler. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1417-1420.

Experimental results. Photograph.

3219* Influence of Soil Salting on the Strength of the Bond of Chlorophyl With the Albumins of the Chloroplasts in the Cotton Plant. **Vliianie pochvennogo zasoleniia na prochnost' sviazi khlorofilla s belkami khloroplastov u khlopchatnika.** (Russian.) B. P. Strogonov and E. F. Ivanitskaia. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 497-499.

Use of various sulfate and chloride mixtures. Tables. 8 ref.

3220* The Inhibition of Photosynthesis by O. **O tormozhenii fotosinteza kislorodom.** (Russian.) I. Ia. Shliapintokh. *Doklady Akademii Nauk SSSR*, v. 99, no. 1, Nov. 1, 1954, p. 141-144.

Relation of rate of reaction to O pressure and eosin concentrations. Graphs. 11 ref.

3221* Methods of Treating Soil and Sowing That Contribute to High and Stable Agricultural Yields. **O metodakh obrabotki pochvy i poseva, sposobstvuiushchikh poluchen'iu vysokikh i ustoichivykh urozhaev sel'skokhoziaistvennykh kul'tur.** (Russian.) T. S. Mal'tsev. *Doklady Vsesoiuznoĭ Ordena Lenina Akademii Sel'skokhoziaĭstvennykh Nauk, Imeni V. I. Lenina*, v. 19, no. 6, 1954, p. 3-24.

Reports results of several years' work in the steppe and forest-steppe region beyond the Urals. Effects of deep and shallow plowing and of annual and perennial grasses on various soils. Tables.

3222* Influence of a Mixture of Organic and Mineral Fertilizers on the Microflora of Soil. **Vliianie smesi organicheskikh i mineral'nykh udobrenii na mikrofloru pochvy.** (Russian.) Iu. M. Vozniakovskaia and A. S. Ryzhkova. *Doklady Vsesoiuznoĭ Ordena Lenina Akademii Sel'skokhoziaĭstvennykh Nauk, Imeni V. I. Lenina*, v. 19, no. 6, 1954, p. 30-33.

Results of introducing mixtures of organic fertilizers with mineral phosphorus and lime fertilizers to winter wheat. Tables.

3223* **Sesame.** Fred Pass. *Farm Quarterly*, v. 9, Winter, 1955, p. 44-45, 114-115.

Description of plant, whose seed is 50% oil, which is developing into a new cash crop for farmers who find a declining market for their cotton. Photographs, tables.

3224 Oxidation and Isomerization Reactions of the Chlorophylls in Killed Leaves. Harold H. Strain. *Journal of Agricultural and Food Chemistry*, v. 2, Nov. 24, 1954, p. 1222-1226.

Enzymatic reactions, pigment separation, and allomerization. Tables. 18 ref.

3225* Phosphate Evaluation. Surface Area of Natural and Processed Phosphates. W. L. Hill, J. H. Caro, and G. A. Wieczorek. *Journal of Agricultural and Food Chemistry*, v. 2, Dec. 8, 1954, p. 1273-1277.

Investigates the major economic classes of water-insoluble phosphates, and indicates the ranges of surface areas likely to be encountered in the most important classes of the slightly-soluble phosphates. Tables, graph. 19 ref.

3226 Use of Copper Derivatives of Chlorophylls in Ratio Method for Estimating Digestibility of Forages. W. W. G. Smart, Jr., Gennard Matrone, and V. W. Smart. *Journal of Agricultural and Food Chemistry*, v. 2, Dec. 22, 1954, p. 1331-1332.

Treating samples with 0.1M $CuCl_2$ in 1N HCl overcame difficulties of "chromogen" method in determining digestion coefficients. Tables. 6 ref.

3227 Allethrin. M. Elliott. *Journal of the Science of Food and Agriculture*, v. 5, Nov. 1954, p. 505-514.

Discusses properties of the eight isomeric forms present in purified, commercial material, and surveys structural features essential for this type molecule in order to have high insecticidal activity. Diagrams, tables. 47 ref.

3228 An Attempt to Solve the Phosphate Problem in Crop Production so as to Economize With the World Supply of Phosphates. Alfred Åslander. *Kungl. Tekniska Högskolans Handlingar (Transactions of the Royal Institute of Technology, Stockholm, Sweden)*, 1954, no. 85. (T4 K96t)

Available P in soil; soil fixation; solubility of phosphates in soil after mixing with humus-forming materials. Photographs, tables, graphs. 47 ref.

3229* Some New Types of Preparation of Highly Active Insecticides. **Inszekticid hatású foszfátészterek előállításának új módszere.** (Hungarian.) György Matolcsy and Elek Oswald. *Magyar Kémiai Folyóirat*, v. 60, no. 11, Nov. 1954, p. 347-348.

Compound more effective than parathion and less toxic to warm-blooded animals than DDT. Method may be applicable to all compounds with olefinic double bond. Table.

3230 Absorption of Ions by Plants. D. Reichenberg and J. F. Sutcliffe. *Nature*, v. 174, Dec. 4, 1954, p. 1047-1048.

Suggests possibility of two distinct mechanisms involved in the transport of ions from an external medium into the vacuoles of individual cells. 18 ref.

3231* Reciprocal Processes Between Humic Substances With Mineral Component of Soil. **Protsessy vzaimodeistviia guminovykh veshchestv s mineral'noi chast'iu pochvy.** (Russian.) L. N. Aleksandrova. *Pochvovedenie*, 1954, no. 9, Sept., p. 23-34.

Humic materials cover mineral particles and with time become firmly attached to them. Tables, graphs. 14 ref.

3232* Shale Ash as Fertilizer. **Slantsevaia zola kak udobrenie.** (Russian.) O. G. Khallik. *Pochvovedenie*, 1954, no. 9, Sept., p. 46-51.

Field tests show ash is better than lime for some crops. Tables. 2 ref.

3233* Action of Chlorine Fertilizers on a Thick Chernozem. **O deistvii khlorsoderzhashchikh udobrenii na moshchnom chernozeme.** (Russian.) S. M. Gurevich. *Pochvovedenie*, 1954, no. 10, Oct., p. 12-22.

Effect of accumulation in soil; comparison with sulfate fertilizers. Tables. 14 ref.

3234 Antibiotics in the Systemic Control of Plant Disease. S. H. Crowdy. *Research*, v. 7, Dec. 1954, p. 483-486.

Describes a novel method of treatment, with a systemic fungicide, where fungi and bacteria are the causative agents.

Agriculture

3235* Relationships Between Phosphate Economy and Photosynthesis. **Über die Beziehungen zwischen Phosphathaushalt und Photosynthese. II.** Increased Absorption of Glucose in Light as an Indicator of a Photodependent Phosphorylization. **Gesteigerter Glucoseeinbau im Licht als Indikator einer lichtabhängigen Phosphorylierung.** (German.) Otto Kandler. *Zeitschrift für Naturforschung*, v. 9b, no. 10, Oct. 1954, p. 625-644.

Effect of light on the absorption of glucose by *Chlorella pyrenoidosa* under various external conditions. Tables, graphs. 28 ref.

3236* The Soils of North Rhine-Westphalia. **Die Böden Nordrhein-Westfalens.** (German.) E. Mückenhausen and H. Wortmann. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 67, no. 2, 1954, p. 97-116 + 4 plates.

Classification and description of soils. Map, photographs.

3237* Pretreatment of Seeds and Leaf-Feeding by Trace Elements. **O predposevnoi obrabotke semian i vnekornevom pitanii mikroelementami.** (Russian.) M. Ia. Shkol'nik and N. A. Makarova. *Zemledelie*, v. 2, no. 11, Nov. 1954, p. 31-36.

Experiments in various soil types with barley, wheat, and potatoes. Tables.

3238* Synthesis and Physiological Activity on Plants of Some β-Aryloxyethanols and Aryoxyacetones. **Sintez i fiziologicheskaia aktivnost' na rasteniiakh nekotorykh β-ariloksietanolov i ariloksiatsetonov.** (Russian.) K. S. Bokarev and N. N. Mel'nikov. *Zhurnal Obshchei Khimii*, v. 24, no. 11, Nov. 1954, p. 2014-2023.

Includes tables. 53 ref.

Books and Miscellaneous Publications

3239 Modern Aspects of pH. James Small. 247 p. 1954. D. Van Nostrand Co., New York. (QD561 Sm18m)

Application of the new pH, based on an empirical standard which measures H ion activity in relation to that of other associated ions, with special reference to plants and soils.

See also:
3248 (nitrogen fixation legumes)
3368 (analysis of insecticides)
3403 (insecticides)
3411 (synthetic plant hormones)
3906 (agricultural uses of peat)
4627 (effects of air pollution on vegetation)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

3240* Fractional Precipitation of Serum Proteins by Heavy Metal Ions. (English.) Tage Astrup, K. Schilling, A. Birch-Andersen, and Erik Olsen. *Acta Chemica Scandinavica*, v. 8, no. 8, 1954, p. 1361-1367.

Prepared by chlorides of Pb, Cu, and Cd. Course of pure bovine serum albumin preparation. Electrophoretograms. 10 ref.

3241 Photosynthesis by Isolated Chloroplasts. II. Photosynthetic Phosphorylation, the Conversion of Light Into Phosphate Bond Energy. Daniel I. Arnon, F. R. Whatley, and M. B. Allen. *American Chemical Society, Journal*, v. 76, Dec. 20, 1954, p. 6324-6329.

Photochemical esterification outside of the living cell. Tables, graphs, chromatogram. 19 ref.

3242 Coenzyme A and Biosynthesis. Fritz Lipmann. *American Scientist*, v. 43, Jan. 1955, p. 37-47.

Recent advances in the development of biochemistry in relation to biosynthesis through enzyme action. Mechanisms of activation by coenzyme A and its role in understanding the building up of cell constituents. Diagrams. 8 ref.

3243 The Spectrophotometric Estimation of Total Penicillins by Conversion to Penicillenic Acid and the Importance of Copper in Controlling the Reaction. F. G. Stock. *Analyst*, v. 79, Nov. 1954, p. 662-670; disc., p. 670-671.

A rapid method, showing limited agreement with biological assay. Tables. 2 ref.

3244* The Biosynthesis of Chlorophyll. **Die Biosynthese des Chlorophylls.** (German.) Walter Siedel. *Angewandte Chemie*, v. 66, no. 23, Dec. 7, 1954, p. 735-738.

Use of the isotope technique and culture of Chlorella mutants shows that chlorophyll is produced from protoporphyrin which is formed by same intermediate products as in human and animal organisms. Structural formulas. 34 ref.

3245 Re-Appraisal of the Role of Vitamins. Leslie J. Harris. *Chemistry & Industry*, 1954, no. 49, Dec. 4, p. 1494-1499.

Discusses 16 aspects of vitamin utilization. Tables. 3 ref.

3246* Biological Activity of α-Aminophosphinic Acids. **Biologicheskaia aktivnost' α-aminofosfinovykh kislot.** (Russian.) V. L. Ryzhkov, M. I. Kabachnik, L. M. Tarasevich, T. Ia. Medved', N. A. Zeitlenok, N. K. Marchenko, V. A. Vagzhanova, E. F. Ulanova, and N. V. Cheburkina. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 849-852.

Influence of various acids on the reproduction of tobacco mosaic virus, the development of silkworms, the destruction of embryos, and the depression of growth of tobacco rootlets. Tables. 11 ref.

3247 Production of Clinical-Type Dextran. I. A. Wolff, R. L. Mellies, R. L. Lohmar, N. N. Hellman, S. P. Rogovin, P. R. Watson, J. W. Sloan, B. T. Hofreiter, B. E. Fisher, and C. E. Rist. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2605-2610.

Partial acid hydrolysis and fractionation from *L. mesenteroides* NRRL B-742 and *S. dextranicum* NRRL B-1254 followed preparation of *Leuconostoc mesenteroides* NRRL B-512 dextran. Clinical tests are not reported. Tables, graphs. 17 ref.

3248* Influence of Combined Nitrogen Compounds on the Nitrogen-Fixing Activity of Tuber Bacteria in Soybeans and Kidney Beans and the Relationship Between Them and Leguminous Plants. **Vliianie sviazannykh soedinenii azota na azotfiksiruiushchyuiu aktivnost' kluben'kovykh bakterii v kluben'kakh soi i fasoli i vzaimootnosheniia mezhdu nimi i bobovymi rasteniiami.** (Russian.) M. V. Fedorov and I. V. Kozlov. *Mikrobiologiia*, v. 23, no. 5, Sept.-Oct. 1954, p. 534-543.

Includes tables, photographs. 7 ref.

3249 Participation of Coenzyme A in the Oxidation of Fat. F. Lynen. *Nature*, v. 174, Nov. 20, 1954, p. 962-965.

Fatty acid cycles in fat metabolism. Diagrams, table, graph. 35 ref.

3250* Retardation of Cancer Growth by Means of 2,4-Dinitrophenol (DNP). Importance of DNP as Cytostaticum. **Hemmung des Krebswachstums durch 2,4-Dinitrophenol (DNP). Bedeutung von DNP als Zytostatikum.** (German.) F. Windisch and W. Heumann. *Naturwissenschaften*, v. 41, no. 20, Oct. 1954, p. 481.

Brief discussion on above effect and review of literature. 13 ref.

3251* **Changes in the Latent Period of a Bacterial Virus.** Ernest Pollard, W. R. Adams, and Shirley Robbins. *Radiation Research*, v. 1, Dec. 1954, p. 514-522.

Results show an increase in latent period takes place when subjected to drying, drying in vacuum, deuteron and α-particle bombardment, X-irradiation, and heat. Graphs, table. 7 ref.

3252* **Effects of Ultrasound on Tobacco Mosaic Virus.** Nelson Newton and John Kissel. *Research Reviews, Office of Naval Research*, 1954, Dec., p. 1-7.

Use of sound waves, at seven million c.p.s. to break apart rod-like cells and to compare the infectivity of the fragmented with the intact virus. Micrographs, graphs. 1 ref.

3253* Catalytic Effect of Blue-Green Light on the Transformation of Energy in Photosynthesis. **Katalytische Wirkung des blaugrünen Lichts auf den Energieumsatz bei der Photosynthese.** (German.) Otto Warburg, Günter Krippahl, and Walter Schröder. *Zeitschrift für Naturforschung*, v. 9b, no. 10, Oct. 1954, p. 667-675.

Transformation of a zymogen into a ferment of photosynthesis in Chlorella under the influence of blue-green light, and the reversion to a zymogen on removal of the light. Graphs, tables. 9 ref.

Books and Miscellaneous Publications

3254 The Proteins. Chemistry, Biological Activity, and Methods. Hans Neurath and Kenneth Bailey, editors. v. II. Pt. B. 756 p. 1954. Academic Press, New York. (QD431 N39p)

Types, structure, reactions, and properties.

3255 Industrial Fermentations. Leland A. Underkofler and Richard J. Hickey, editors. v. II. 578 p. 1954. Chemical Publishing Co., New York. (TP505 In2)

Laboratory procedure to plant practice for microbiological ketogenic processes; production of 2,3-butanediol, enzymes, vitamins, and pharmaceuticals; miscellaneous operations.

3256 The Chemical Structure of Proteins. G. E. W. Wolstenholme and Margaret P. Cameron, editors. 222 p. 1954. Little, Brown and Co., Boston. (QD431 C48c)

An international Ciba Foundation Symposium consisting of 16 papers with discussions on various aspects of the subject.

See also:
3199 (molluscicides)
3220 (inhibition of photosynthesis by O_2)
3234 (control of plant diseases)
3382 (gas analysis for biochemists)
3490 (protein reactions)
3873 (research on vitamins and hormones)
3874 (chemistry of vitamins)
3909 (scientific progress in biology)

CERAMICS AND CONCRETE

3257 Applications of Color Difference Measurements in Porcelain Enamels. Robert F. Patrick. *American Ceramic Society Bulletin*, v. 33, Dec. 1954, p. 361-367.

Two small color difference formulas were tested which gave results that correlated well with visual observations on enamel cover coats. Graphs, tables. 8 ref.

3258 Review of Some Organic Binders for Use in Structural Clay Products. Alfred Wild. *American Ceramic Society Bulletin*, v. 33, Dec. 1954, p. 368-370.

Includes graphs.

3259 Experimental Study of Fracture of Glass. II. Experimental Data. Errol B. Shand. *American Ceramic Society, Journal*, v. 37, Dec. 1954, p. 559-572.

Experiments support the concept of the close association between fracture origin and flaws. Graphs ,tables, diagrams. 20 ref.

3260 Sintering and Grain Growth of Alumina. W. J. Smothers and H. J. Reynolds. *American Ceramic Society, Journal*, v. 37, Dec. 1954, p. 588-595.

Effects of added impurities. Tables, micrographs, graphs. 31 ref.

3261 Note on Sintering of ThO_2. J. R. Johnson and C. E. Curtis. *American Ceramic Society, Journal*, v. 37, Dec. 1954, p. 611.

Effect of firing time at 1700 C on 99.5% ThO_2 - 0.5% CaO bodies. Photograph, graph.

3262 The System Al_2O_3-SiO_2-H_2O. Rustum Roy and E. F. Osborn. *American Mineralogist*, v. 39, Nov.-Dec. 1954, p. 853-885.

Application of equilibrium relationships to geological and ceramic problems. Tables, micrograph, diffraction pattern, graph, phase diagrams, diagrams. 44 ref.

3263 Symposium on Elasticity and Visco-Elasticity in Ceramics. *British Ceramic Society, Transactions*, v. 53, Nov. 1954, p. 697-763.

Six papers on stress-strain theory, elastic properties, creep, and flow of tile, glass, and refractories. Graphs, diagrams, tables. 32 ref.

3264* Utilization of Centrifugal Furnaces for the Treatment of Substances at High Temperature by Solar Energy. **Utilisation de fours centrifuges pour le traitement par l'énergie solaire des substances à haute température.** (French.) Félix Trombe and Marc Foex. *Bulletin de la société chimique de France*, 1954, no. 10, Oct., p. 1315-1322.

Describes furnaces and use for melting Mullite and Nemours sand (quartz grains 0.2-0.3 mm. diameter). Diagrams, graphs, photographs. 8 ref.

3265* Study of the Sintering Phenomenon, in Relation to Shrinkage, for Non-Metallic Mineral Powders. **Étude du phénomène de frittage, en relation avec le retrait, pour des poudres minérales non métalliques.** (French.) Albert Nicol and Marthe Dominé-Bergès. *Bulletin de la société chimique de France*, 1954, no. 10, Oct., p. 1323-1337.

Relationship between crystallized state of sintered substances and shrinkage. Diagram, graphs, tables, micrographs. 50 ref.

3266 Thermal Expansion Properties of Some High Silica Bodies in the System Lithia-Alumina-Silica. Edward J. Smoke. *Ceramic Age*, v. 64, sec. 1, Dec. 1954, p. 11-15.

Investigates means of removing sudden expansion, characterized by quartz at 573 C and the benefits to be derived. Graphs, tables, phase diagram. 2 ref.

3267 How to Choose the Proper Materials for Color Production. E. Reigh Bullard. *Ceramic Age*, v. 64, sec. 1, Dec. 1954, p. 23-24, 29-30.

Presents color effects by various processes, methods of color production in enamels, raw materials, calcining temperatures, processing of color oxides, and enamel frit selection for use with oxides.

3268* Variations of the Crystalline Parameters and the $\alpha \rightleftharpoons \beta$ Transformation Temperature in Synthetic Quartz. **Variations des paramètres cristallins et de la température de transformation $\alpha \rightleftharpoons \beta$ dans des quartz de synthèse.** (French.) Germain Sabatier and Jean Wyart. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1053-1055.

Includes graph.

3269 45th Report of the Joint Refractories Committee: 1953-54. A. L. Roberts, A. J. Penston, and A. T. Green. *Gas Council, Research Communication* GC16, Nov. 1954, 71 p. (TP700 G21.2r)

Sponsored by the Gas Council and the British Ceramic Research Assn. Five papers on behavior of fire-brick in retorts. Photographs, tables, diagrams, graphs. 15 ref.

3270 Networks in Glasses and Other Polymers. J. M. Stevels. *Glass Industry*, v. 35, Dec. 1954, p. 657-662.

The power factor of glasses and other polymers at low temperatures; relaxation phenomenon. Graphs, photographs, diagram. 7 ref.

3271* Microscopy of Metallurgical Fire Clay. **Mikroskopie hutnického šamotu.** (Czech.) Rudolf Bárta and Miloslav Bartuška. *Hutnické Listy*, v. 9, no. 7, July 1954, p. 410-417.

Structural changes during firing; microscopical evaluation of products. Graphs, micrographs. 19 ref.

3272* **The Use of Titanium Oxide in Vitreous Enamels.** *Industrial Finishing (London)*, v. 7, Nov. 1954, p. 280 + 6 pages.

Describes formulation, qualities, and chemistry of white and colored frits. Tables, graphs. 10 ref.

3273 Castable Refractories: Where to Use Them to Best Advantage. H. G. Hart. *Iron Age*, v. 174, Dec. 30, 1954, p. 47-49.

Convenience, ease of installation, resistance to thermal shock, low permeability, and good abrasion resistance lead to increasing use. Photographs, table.

3274 A Survey of the Results of the Examination of the Brickwork of Blown-Out Blast-Furnaces. H. M. Richardson and G. R. Rigby. *Iron and Steel Institute Special Report no.* 51, Oct. 1954, 35 p. (TN601 I6s)

Data for 79 furnaces at 30 plants examined during the last 20 yr.

3275* Investigation on the Influence of the Sintering Temperature on Mechanical, Structural, and Electromagnetic Properties of "Oxifer-2000", **Issledovanie vliianiia temperatury**

Ceramics and Concrete

spekaniia na mekhanicheskie, strukturnye i elektromagnitnye svoistva Oksifera-2000. (Russian.) A. A. Shvarts. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia*, v. 18, no. 4, July-Aug. 1954, p. 489-493 + 1 plate.

Relationship of temperature, crystal type, and electromagnetic properties. Micrographs, graphs. 3 ref.

3276 The Effect of Organic Matter on the Setting of Soil-Cement Mixtures. K. E. Clare and P. T. Sherwood. *Journal of Applied Chemistry*, v. 4, Nov. 1954, p. 625-630.

Most active compounds are glucose and nucleic acid. Calcium chloride avoids retarding effects. Graphs. 19 ref.

3277 The Grinding of Kaolinite. I. A Preliminary Study. S. J. Gregg, K. J. Hill, and T. W. Parker. *Journal of Applied Chemistry*, v. 4, Nov. 1954, p. 631-632.

Changes in physical properties by grinding. Table. 5 ref.

3278 Phase Equilibria in the System CaO-TiO_2. R. C. DeVries, R. Roy, and E. F. Osborn. *Journal of Physical Chemistry*, v. 58, Dec. 1954, p. 1069-1073.

Compounds $CaO \cdot TiO_2$ and $3CaO \cdot 2TiO_2$ are reported. Phase diagrams, tables, X-ray diffraction patterns. 13 ref.

3279 Some Properties of Porcelains and Phase Relations in the Ternary Systems of Beryllia and Zirconia With Titania, Ceria, and Chromia. S. M. Lang, R. S. Roth, and C. L. Fillmore. *Journal of Research, National Bureau of Standards*, v. 53, Oct. 1954, p. 201-210.

Physical property studies for mixtures in the systems BeO-TiO_2-ZrO_2, BeO-CeO_2-ZrO_2, and BeO-Cr_2O_3-ZrO_2; approximate equilibrium relations. Tables, phase diagrams. 25 ref.

3280* Investigation of Structural-Mechanical Properties of Concentrated Water Suspension of Cement in the Process of Setting. **Issledovanie strukturno-mekhanicheskikh svoistv kontsentrirovannykh vodnykh suspenzii tsementa v protsesse skhvatyvaniia.** (Russian.) E. E. Kalmykova and N. V. Mikhailov. *Kolloidnyi Zhurnal*, v. 16, no. 5, Sept.-Oct. 1954, p. 350-357.

Data on plasticity and elasticity of different types of cement. Graphs, diagram, table, photograph. 6 ref.

3281* Action of Sodium Carbonate and Pyrophosphate on Clay Suspensions. **O deistvii karbonata i pirofosfata natriia na suspenzii glin.** (Russian.) V. L. Kvirikoshvili. *Kolloidnyi Zhurnal*, v. 16, no. 6, Nov.-Dec. 1954, p. 442-446.

Experimental data on Caucasian clay and resulting structural change. Tables, graphs. 7 ref.

3282* Sintering of Magnesia for Refractories. **Sinterizzazione della magnesia da destinarsi alla fabbricazione dei refrattari.** (Italian.) V. Cirilli. *Metallurgia italiana*, v. 46, no. 9, Sept. 1954, p. 313-316.

Mineralizing agents and their effects on refractoriness. Graphs, diagrams. 13 ref.

3283* Refractoriness Tests. **Sulle prove di refrattarietà.** (Italian.) R. Zoja. *Metallurgia italiana*, v. 46, no. 10, Oct. 1954, p. 343-346.

Behavior of refractories and metallurgical slags in their melting ranges. Diagrams, graph. 3 ref.

3284* Role of the Alumina Content in Refractory Products. **Le rôle de la teneur en alumine dans les produits réfractaires.** (French.) Louise Halm. *Métaux, Corrosion-Industries*, v. 29, no. 350, Oct. 1954, p. 385-398.

Includes diagrams, tables, micrographs. 10 ref.

3285* H.F.-Heating of Insulating Materials and Ceramic Substances. **HF-Erwärmung von Isolierstoffen und keramischen Körpern.** (German.) W. Holzmüller. *Nachrichtentechnik*, v. 4, no. 10, Oct. 1954, p. 418-424.

Mathematical investigation on the successful uniform heating of dielectric substances with H.F. current. Diagrams, graphs. 7 ref.

3286* Method of Manufacturing of Chromite-Magnesite Products. **Opracowanie metody produkcji wyrobów chromitowo-magnezytowych.** (Polish.) Z. Satczek. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 5, 1954, p. 235-238.

Effects of various additions and treatments on properties. Tables, photographs, micrographs.

3287 Viscosity and the Structure of Molten Silicates. J. O'M. Bockris and D. C. Lowe. *Royal Society, Proceedings*, v. 226, ser. A, Dec. 7, 1954, p. 423-435.

Magnetically controlled null-point modification of the rotating crucible viscometer enables measurements of viscosities up to 1850 C. Application of instrument to the system CaO-SiO_2. Graphs, tables. 48 ref.

3288* Thermoanalytical Investigations on Fresh and Seasoned Portland Cements. **Thermoanalytische Untersuchungen an frischen und gelagerten Portlandzementen.** (German.) P. Esenwein. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 11, Nov. 1954, p. 365-370.

Use of the thermoscale and differential thermoanalysis in the investigation of the deteriorating effect of time. Graphs, table. 2 ref.

3289* The Chemical Homogeneity of Fourcault Glasses. **Die chemische Homogenität des Fourcaultglases.** (German.) Carl Hesse. *Silikattechnik*, v. 5, no. 10, Oct. 1954, p. 419-425.

The glass is inhomogeneous due to stratification, with the arrangement of the layers affecting its transparency. Describes a simple device for evaluating the waviness of the glass surface. Micrographs, diagrams, graphs, photographs, tables. 1 ref.

3290* Investigations on the Moldability of Ceramic Bodies. **Untersuchungen zur Bildsamkeit keramischer Massen.** (German.) Theodor Haase. *Silikattechnik*, v. 5, no. 10, Oct. 1954, p. 429-432.

Review of literature. Suggests possibility of rendering dry sand moldable by artificial means and of improved moldability by rapid deformation. Photographs, graphs. 11 ref.

3291* The Properties of Sorel Cements. **Zur Kenntnis der Eigenschaften von Sorelzementen.** (German.) Otakar Kallauner and Viktor Stopka. *Silikattechnik*, v. 5, no. 10, Oct. 1954, p. 433-436.

Studies the effects of differently calcined magnesites in the presence of $MgCO_3$, $Mg(OH)_2$, and $Ca(OH)_2$ on setting properties, vol. stability, and moisture content of Sorel cements. Tables. 1 ref.

3292* Production of Quartz Ware in the Electrical Resistance Furnace. **Die Herstellung des Quarzgutes im elektrischen Widerstandsofen.** (German.) Max Kutschenreiter. *Silikattechnik*, v. 5, no. 10, Oct. 1954, p. 439-440.

Production of industrial acid-resistant equipment. Photographs, diagrams. 3 ref.

3293* Electronic-Microscopic Investigation of the Structure of Etched Glass Surface. **Elektronno-mikroskopicheskoe issledovanie struktury travlenoi poverkhnosti stekla.** (Russian.) V. I. Sheliubskii. *Steklo i Keramika*, v. 11, no. 10, Oct. 1954, p. 19-22.

Similarity of etching shapes and patterns on different types of glass. Micrographs. 8 ref.

3294* A New Method of Determining the Modulus of Elasticity of Glass by Photoelasticity. **Novyi sposob opredeleniia modulia uprugosti stekla metodom fotouprugosti.** (Russian.) N. K. Dertev. *Steklo i Keramika*, v. 11, no. 11, Nov. 1954, p. 5-6.

Mathematical analysis. Table.

3295* Effect of Increased Content of MgO on the Crystallization of Glasses. **Vliianie povyshennogo soderzhaniia MgO na kristallizatsiiu stekol.** (Russian.) M. V. Okhotin and R. S. Levina. *Steklo i Keramika*, v. 11, no. 11, Nov. 1954, p. 6-9.

Studies on prevention of devitrification. Table, graphs.

3296* Forming Properties of Glass Batches. **Formovochnye svoistva stekol'nykh shikht.** (Russian.) L. G. Mel'nichenko. *Steklo i Keramika*, v. 11, no. 11, Nov. 1954, p. 9-12.

Effects of composition and temperature. Graphs.

3297* Possibility of Enriching Quartz Sands. **Obogatimost' kvartsevykh peskov.** (Russian.) G. P. Slavnin. *Steklo i Keramika*, v. 11, no. 11, Nov. 1954, p. 12-14.

Compositions of sands. Various beneficiation methods. Tables, microphotographs.

3298* Methods of Preliminary Concentration of Argillaceous Materials for the Production of Porcelain-Faience Products. **Sposoby predvaritel'nogo obogashcheniia glinistykh materialov dlia proizvodstva farforo-faiansovykh izdelii.** (Russian.) B. N. Ol'shevskii. *Steklo i Keramika*, v. 11, no. 11, Nov. 1954, p. 18-20.

Description and operation of mixers, magnetic filters, ball mills, and other equipment. Diagram.

3299* Thermal Treatments Modifying the Properties of Glass, Particularly Its Brittleness. **Traitements thermiques modifiant les propriétés du verre, en particulier sa fragilité.** (French.) Paul Acloque. *Verres et réfractaires*, v. 8, no. 5, Sept.-Oct. 1954, p. 243-253.

Examines various treatments having structural, physicochemical, and purely rheological effects on glasses. Applications. Graphs, micrograph. 11 ref.

3300* The Hardness Anisotropy of Synthetic Corundum. **Zur Härte-Anisotropie des synthetischen Korunds.** (German.) Fritz Albrecht. *Zeitschrift für Kristallographie*, v. 106, no. 2, Oct. 1954, p. 183-190.

New methods of investigating strength properties; wear and shear resistance, and Vickers hardness of specimens of different shades of red. Diagrams, photograph, graph. 4 ref.

3301* The Influence of Surface-Active Substances on Change of Structure of Concrete. **K vliianiiu poverkhnostnoaktivnykh veshchestv na izmenenie struktury tsementnogo kamnia.** (Russian.) V. A. Tikhonov and L. A. Tikhomirova. *Zhurnal Prikladnoi Khimii*, v. 27, no. 10, Oct. 1954, p. 1067-1081.

Mechanism involved in the small additions of NH_4- and Caligno-sulfates, phthalic acid, and certain other substances to increase the strength properties of concrete. Tables, X-ray patterns, micrographs. 26 ref.

3302* Shear Strength and the Internal Friction of De-Aired Clay. **Predel'noe napriazhenie sdviga i vnutrennee trenie vakuumirovannoi gliny.** (Russian.) P. P. Budnikov and I. A. Al'perovich. *Zhurnal Prikladnoi Khimii*, v. 27, no. 11, Nov. 1954, p. 1194-1206.

Deformation properties of de-aired bodies. Tables, graphs, diagram. 11 ref.

3303* Electrical Strength of Porcelain. **Ob elektricheskoi prochnosti farfora.** (Russian.) A. P. Butra. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1561-1567.

Includes diagram, graphs, tables. 3 ref.

3304* Ferromagnetic Properties of Solid Solutions in the Barium Titanate-Strontium Titanate System. **Segnetoelektricheskie svoistva tverdykh rastvorov v sisteme titanat bariia-titanat strontsiia.** (Russian.) G. A. Smolenskii and K. I. Rozgachev. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p .1751-1760.

Includes table, graphs. 14 ref.

See also:
3198 (ceramic fertilizers)
3348 (characterization of hydrated aluminas)
3559 (montmorillonite suspensions)
3840 (ceramic production in Europe)
4073 (carbon and graphite electrodes)
4104 (foundry sand definitions)
4288 (wire for prestressed concrete)
4420 (phase diagram for Ti-TiO_2 system)
4434 (brittleness of cermets)
4530 (rupture of quartz)
4548 (structure of amorphous materials)
4576 (properties of $BaTiO_3$-$BaZrO_3$)

CHEMICAL ENGINEERING

3305 Synthetic Detergents From Animal Fats. The Sulfation of Tallow Alcohols. J. K. Weil, A. J. Stirton, and R. G. Bistline, Jr. *American Oil Chemists' Society, Journal*, v. 31, Nov. 1954, p. 444-447.

Sodium oleyl sulfate preparation using SO_3, chlorosulfuric acid, or sulfuric acid. Tables, graph. 22 ref.

3306 Plate Heat Exchangers. J. F. Jupp. *Canadian Chemical Processing*, v. 38, Dec. 1954, p. 48, 50, 52.

Efficiency, design flexibility, and cleaning ease. Photographs, diagram.

3307 Ion Exchange Sweetens Sugar. *Chemical Engineering*, v. 62, Jan. 1955, p. 122, 124.

Successful use on both cane and beet sugar claimed by Layton Co. of Utah. Photograph.

3308 How to Evaluate Variables in Counterflow Cooling Towers. Jack Whitesell. *Chemical Engineering*, v. 62, Jan. 1955, p. 187-191.

Estimation of requirements from equations and graphs. 5 ref.

3309 How to Design Gas-Cooling Towers. II. G. H. P. Bras. *Chemical Engineering*, v. 62, Jan. 1955, p. 195-198.

A producer gas-cooler is exemplified. Graphs, tables. 11 ref.

3310 Chemical Engineering Fundamentals. Catalytic Vapor Phase Reactions. I. Thomas E. Corrigan. *Chemical Engineering*, v. 62, Jan. 1955, p. 199-202.

Adsorption is considered in catalysis. 2 ref. (To be continued.)

3311* Cost of "Karbate" Impervious Graphite Heat Exchangers. W. W. Palmquist. *Chemical Engineering Costs Quarterly*, v. 4, Oct. 1954, p. 111-117.

Engineering data. Graphs, photographs, tables.

3312 Evaluating Performance Characteristics of Mechanical Mixing Processes: The Dextrose-Kaolinite-Water System. Alan S. Michaels and Vytautas Puzinauskas. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 604-614.

Studies dry mixing or mixing with a small amount of liquid in five ratios of water to solids. Photographs, tables, graphs. 7 ref.

3313 Helical Coil Heat Transfer in Mixing Vessels. J. Y. Oldshue and A. T. Gretton. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 615-621.

Effects of impeller speed, power, impeller size, baffle position, and tube diameter over a Reynolds number range of 400 to 1,500,000. Photograph, diagrams, tables, graphs. 7 ref.

3314 The Turbine as a Mixing Tool. E. J. Lyons and N. H. Parker. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 629-632.

Design details for several types. Photographs, chart, diagrams. 7 ref.

3315 Batch Fractional Liquid-Liquid Extraction; A Classification of Processes and Their Possible Application in Industry. H. R. C. Pratt. *Chemical Engineering Science*, v. 3, Nov. 1954, p. 189-200.

Reviews ten different systems. Graphs, flowsheets. 25 ref.

3316 Approximation Methods for Designing Cooler-Condensers. R. C. Cairns. *Chemical Engineering Science*, v. 3, Nov. 1954, p. 215-227.

Reviews and compares several current methods. Graphs, tables. 10 ref.

3317* Gas Bubbles in Liquids. **Gasblasen in Flüssigkeiten. II.** The Ascent of Gas Bubbles in Liquids. **Der Aufstieg von Gasblasen in Flüssigkeiten.** (German.) W. Siemes. *Chemie-Ingenieur-Technik*, v. 26, no. 11, Nov. 1954, p. 614-630.

A thorough investigation of the hydrodynamic behavior of bubble columns, by studying speed of their ascent, course, and form. Material transition in columns. Graphs, diagrams, tables. 42 ref.

3318 Fresh Water From Sea Water Evaporators at the Morro Bay Steam Plant. Albert W. Bruce. *Combustion*, v. 26, Dec. 1954, p. 65-68.

Describes the evaporator cycle and equipment required, economic factors, and advantages. Diagrams, photograph.

Chemical Engineering

3319* Purifying Crude Oil and Heavy Oil for Diesel Engines by Self-Cleaning Separators. **Reinigung von Rohöl und Schweröl für Dieselmotoren durch selbstreinigende Separatoren.** (German.) Walter Opdenberg and Heinrich Hemfort. *Erdöl und Kohle,* v. 7, no. 11, Nov. 1954, p. 724-728.

Design and operation of oil-cleaning devices. Diagrams, tables, graph, photographs. 5 ref.

3320* Thermodynamic Study of the Autothermal Reforming of Propane. **Etude thermodynamique du reforming autothermique de propane.** (French.) Daniel Ringuet. *Flamme et thermique,* v. 8, no. 74, Nov. 1954, p. 31-35, 37.

Reforming as a factor in the recovery of refinery residual gases by autothermal conversion. Graphs. (To be continued.)

3321 Utilization of Methane. F. E. Mills and J. A. Prigg. *Gas Council, Research Communication* GC21, Nov. 1954, 57 p. + 3 plates. (TP700 G21.2r)

Studies interchangeability of town gas composition and use of CH_4. Tables, graphs. 39 ref.

3322 A New Short Mix Process for Continuous Refining of Fats and Fatty Oils. B. Braae. *Industrial Chemist and Chemical Manufacturer,* v. 30, Nov. 1954, p. 523-528.

Principle and operational techniques involving a new hermetic centrifugal separator. Economics of the process and advantages of the method outlined. Diagrams, photographs, tables.

3323 Liquid-Liquid Extraction in Theory and Practice. H. R. C. Pratt. *Industrial Chemist and Chemical Manufacturer,* v. 30, Dec. 1954, p. 597-601.

Presents and explains extractor chart. Nineteen design aspects are considered. Table. 69 ref. (To be continued.)

3324 The Production of Titanium Dioxide. *Industrial Chemist and Chemical Manufacturer,* v. 30, Dec. 1954, p. 602-608.

A photographic tour of the Laporte plant at Stallingborough, England. Flowsheet.

3325 Hydrofluoric Acid Handling. *Industrial Chemist and Chemical Manufacturer,* v. 30, Dec. 1954, p. 609-610.

Materials used with aqueous and anhydrous HF. 5 ref.

3326 Heating Small Reactors. High Temperature Fluidized Solids Bath for Continuous Systems. C. E. Adams, M. O. Gernand, and C. N. Kimberlin, Jr. **Cyclic Temperature Control for Batch Fluidized Solids Units.** L. I. Griffin, Jr. and J. F. Moser, Jr. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2458-2462.

First system is simple, economical from 100 to 1600 F. Second affords rapid temperature control. Photograph, diagrams. 7 ref.

3327 Nomographs for Lewis-Matheson Distillation Calculations. F. Rodriguez and T. J. Walsh. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2509-2511.

Eliminates trial-and-error solution for temperature by use of nomograms. Tables. 6 ref.

3328 Low-Temperature Phase Equilibria. Methane-Propane System. W. W. Akers, J. F. Burns ,and W. R. Fairchild. **Carbon Dioxide-Propane System.** W. W. Akers, R. E. Kelley, and T. G. Lipscomb. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2531-2536.

Systems studied from 32 to −176 F for petroleum refining. Diagram, tables, graphs. 10 ref.

3329 Reforming With Carbon Catalysts. Robert A. Sanford and Bernard S. Friedman. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2568-2571.

Most effective promotion is by treatment with steam at 1300 F for improved octane from naphtha stocks. Steam dilution supplies required heat. Tables. 5 ref.

3330 Hydraulic Gradients on Bubble-Cap Plates. H. C. Bijawat. *Journal of Applied Chemistry,* v. 4, Nov. 1954, p. 596-602.

Derives equation from repeated acceleration and deceleration of liquid. Diagrams, graphs. 8 ref.

3331 Recent Advances in Petroleum Refining. B. H. Shoemaker, E. L. d'Ouville, and Robert F. Marschner. *Journal of Chemical Education,* v. 32, Jan. 1955, p. 30-36.

Review of progress over the last 10-yr. Graphs. 24 ref.

3332 Hydrofining of Middle Distillates. Robert C. Morbeck. *Oil and Gas Journal,* v. 53, Jan. 3, 1955, p. 94, 96, 98.

Improves color and color stability, desulfurization, odor, burning and blending characteristics, and stability without loss in product yield. Tables, photograph. 2 ref.

3333* Chemical and Waste Heat Recovery Unit for Alkaline Pulping. Vincent P. Owens. *Paper Mill News,* v. 77, Dec. 4, 1954, p. 50 + 4 pages.

Impact of modern design on this former "back-room" operation. Diagrams, graphs, tables, photographs. 3 ref.

3334 Flexible Refinery Design. J. W. Packie and D. L. Campbell. *Petroleum Processing,* v. 9, Dec. 1954, p. 1881-1884.

Five elements are considered. Tables.

3335 Acetone—Its Production and Uses. Peter W. Sherwood. *Petroleum Refiner,* v. 33, Dec. 1954, p. 144-145.

Discusses the market and outlook for acetone production, major processes used, and processes by which it is converted into a wide variety of important chemical products. Tables, diagrams, photographs. 39 ref.

3336* The Reclamation of Used Oils. II. The Tools and Materials for Reclamation. E. G. Ellis. *Scientific Lubrication,* v. 6, Nov. 1954, p. 14-19, 26.

Various processes commonly used for removal of soluble and insoluble bodies. Diagrams, photographs. (To be continued.)

Books and Miscellaneous Publications

3337 Chemical Technology. Organic Technology. **Chemische Technologie. Organische Technologie.** (German.) Karl Winnacker and Ernst Weingaertner, editors. v. IV. Pt. II. 1191 p. 1954. Carl Hanser Verlag, München. (QD151 W73c)

Treatises by different authors on aromatic by-products; organic pigments; use and properties of tar pigments; materials for the textile and laundry industry; bleaching; explosives and fuels; turpentines and camphor; production of films, plates, and papers; production of leather; plastics; rubber; silicones; raw materials for lacquers; foods; starch and starch derivatives; sugar, chemical pesticides, and medicines.

See also:
3255 (industrial fermentations)
3500 (catalysts for gasoline production)
3502 (thermal conductivity of organic liquids)
3651 (pipes for corrosive chemicals)
3772 (feedback control)
3841 (consumption of petroleum products)
3848 (plant adaptation)
3860 (new developments in mixing)
3861 (mass transfer between phases)
4463 (production of heavy water)
4501 (grinding and classification)
4528 (heat transfer in packed beds)

CHEMISTRY—ANALYTICAL AND INORGANIC

3338* Iodometric Analysis of Certain Types of Selenenyl Compounds. (English.) Olav Foss and Sven R. Svendsen. *Acta Chemica Scandinavica,* v. 8, no. 8, 1954, p. 1351-1356.

Describes preparations; rearrangements. Tables. 13 ref.

3339 The Determination of Monoglycerides and Glycerin in Mixtures. Margaret Kruty, J. B. Segur, and C. S. Miner, Jr. *American Oil Chemists' Society, Journal,* v. 31, Nov. 1954, p. 466-469.

Based on oxidation of sample with periodic acid. Table. 6 ref.

3340 A Method of Calculating Fatty Acid Composition From Ester Fractionation Analysis. E. W. Jones and M. A. MacLean. *American Oil Chemists' Society, Journal,* v. 31, Nov. 1954, p. 473-475.

Determined by simultaneous equations. Diagrams. 2 ref.

3341 The Preparation of Pressed Discs of Purified Potassium Chloride Containing Solid Samples for Infra-Red Spectrometry. J. L. Hales and W. Kynaston. *Analyst*, v. 79, Nov. 1954, p. 702-706.

Preparation of KCl standard specimens. Tables, diagram, circuit diagram. 7 ref.

3342* Sodium Meta-Vanadate as Volumetric Reagent. II. Iodine Monochloride Method. (English.) Balwant Singh and Ranjit Singh. *Analytica Chimica Acta*, v. 11, no. 5, Nov. 1954, p. 412-416.

Compound used for determination of H_2O_2, PbO_2, MnO_2, Se_2O_3, $K_2S_2O_8$, $CuSO_4$, HCOONa, and Na_2S in acid solution. Tables. 2 ref.

3343* Cerate Oxidimetry. I. Oxidation of Formic, Glycolic, Malic, Malonic and Tartaric Acids. (English.) N. N. Sharma and R. C. Mehrotra. *Analytica Chimica Acta*, v. 11, no. 5, Nov. 1954, p. 417-427.

Includes tables. 10 ref.

3344* Photometric Determination of Bismuth With Hydrobromic Acid. **Die photometrische Bestimmung des Wismuts mit Bromwasserstoffsäure.** (German.) Walter Nielsch and Gerhard Böltz. *Analytica Chimica Acta*, v. 11, no. 5, Nov. 1954, p. 438-443.

An ultra-violet method for 1 to 15 μg. Bi per ml. Graph, tables. 6 ref.

3345* Study of the Use of *Iso*nitrosomalonylguanidine in Determining the Amount of Iron in Aluminum Alloys and Zinc, and in Determining the Amount of Cobalt in Steels. **Etude de l'application de l'*iso*nitrosomalonylguanidine au dosage du fer dans les alliages d'aluminium et dans les zincs et au dosage du cobalt dans les aciers.** (French.) M. Jean. *Analytica Chimica Acta*, v. 11, no. 5, Nov. 1954, p. 451-462.

Includes graphs, tables. 10 ref.

3346* Potentiometric Measurement of Reaction Rates and of Extremely Small, Catalytically Active Quantities of Substances. Iodide and Copper. **Potentiometrische Messung von Reaktionsgeschwindigkeiten und vom kleinsten, katalytisch wirksamen Stoffmengen. Jodid und Kupfer.** (German.) F. L. Hahn. *Analytica Chimica Acta*, v. 11, no. 5, Nov. 1954, p. 482-486.

Includes graphs. 7 ref.

3347 Gradient and Rate Aspects in Paper Chromatography. Betty-Jean Ackerman and Harold G. Cassidy. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1874-1876.

Ten present-day filter papers compared by a study with 141 liquids. Table, graphs. 19 ref.

3348 Characterization of Hydrated Aluminas by Infrared Spectroscopy. Application to Study of Bauxite Ores. Leo D. Frederickson, Jr. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1883-1885.

Four phases are resolved by O-H absorption patterns. Tables, infra-red spectra. 18 ref.

3349 Separation of Titanium Combined With Spectrophotometric Determination of Titanium in Steel. Joseph R. Simmler, Karl H. Roberts, and Samuel M. Tuthill. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1902-1904.

Co-precipitated with Zr and then isolated. Tables. 10 ref.

3350 Extension of Isotopic Method for Determining Oxygen in Metals to Copper Containing 0.01 to 0.1 Weight % of Oxygen. A. D. Kirshenbaum and A. V. Grosse. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1955-1956.

Includes diagram, tables. 25 ref.

3351 Isotopic Analysis of Some Gaseous Boron Hydrides by Thermal Conductivity. W. S. Koski, P. C. Maybury, and Joyce J. Kaufman. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1992-1994.

Includes tables, graph. 6 ref.

3352* Determination of Metallic Iron in Slags and Ores. **Die Bestimmung von metallischem Eisen in Schlacken und Erzen.** (German.) Karl Abresch and Richard Dawirs. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 409-412; disc., p. 412.

Experimental determination of Fe contents by magnetic separation and reduction. Tables, diagrams. 4 ref.

3353* Rapid Determination of Small Amounts of Carbon in Steel According to the Baryte Shaking Process. **Die Schnellbestimmung kleiner Mengen Kohlenstoff im Stahl nach dem Baryt-Schüttelverfahren.** (German.) Theodor Heczko. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 413-416.

Instruments; procedure; effect of CO_2 content on the O_2 of combustion and the S content in steel. Diagrams, table. 7 ref.

3354* Ion Exchangers in Analytical Chemistry. **Ionenaustauscher in der analytischen Chemie.** (German.) Hermann Specker. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 417-419; disc., p. 419-420.

Natural and synthetic ion exchangers; mass effect of exchange processes; efficiency; development of selective ion exchangers. 6 ref.

3355* Alternating Current Polarography of Organic Compounds. I. General Introduction and Theory. B. Breyer, H. H. Bauer, and S. Hacobian. *Australian Journal of Chemistry*, v. 7, Nov. 1954, p. 305-311.

Role of absorption, relationship of a.c. and d.c. Diagram, graph. 10 ref.

3356* Rapid Determination of the Ash Content of Coals by Specific Gravity Measurements. **Ásványi szenek hamutartalmának gyors meghatározása fajsúlymérés alapján.** (Hungarian.) Sándor Körösi and Pál Rhédey. *Bányászati Lapok*, v. 9, no. 11, Nov. 1954, p. 578-586.

Use of a semi-automatically controlled hydrostatical balance and a moisture standardizing centrifuge permits analysis to measure up to plant standards. Tables, graphs, diagrams, photograph. 20 ref.

3357* Elementary Analysis of Coals, Especially Direct Oxygen Determination. **Elementaranalyse von Kohlen, insbesondere die direkte Sauerstoffbestimmung.** (German.) H. W. Deinum. *Brennstoff-Chemie*, v. 35, nos. 21-22, Nov. 1954, p. 334-337.

Methods of determining the C, H_2, N_2, S, and O_2 content of coal. Diagrams, photographs, tables.

3358* Chemical Analysis for Nitrogen as an Indication of the Nitride Forming Elements in Cast Iron. L. W. L. Smith. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Dec. 1954, p. 481-489.

Includes tables, graphs. 2 ref.

3359* Hydrogen in Cast Iron. B. B. Bach, J. V. Dawson, and L. W. L. Smith. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Dec. 1954, p. 490-501.

Apparatus and technique of vacuum heating method. Table, diagrams, graphs. 10 ref.

3360 Analytical Chemistry of the Halogens. *Chemical Age*, v. 71, Dec. 11, 1954, p. 1241-1245.

A rapid review of this field by Dr. R. H. Belcher. Instrumentation and F analysis are not included. 45 ref.

3361* Iodometric Determination of Uranium. **Jodometrische Bestimmung von Uran.** (German.) G. S. Deshmukh and M. K. Joshi. *Chemische Berichte*, v. 87, no. 10, 1954, p. 1446-1448.

Includes table. 5 ref.

3362 Some Applications of the Van Slyke Manometric Technique. G. Ingram. *Chemistry & Industry*, 1954, no. 50, Dec. 11, p. 1527-1531.

Apparatus and auxiliary equipment; amino nitrogen, C, CO, and CO_2 determinations. Diagrams. 12 ref.

3363* Sulfur in Coal. **El azufre en el carbon. III.** Determination of Total Sulfur in Its Different Forms. **Determinación del azufre total en sus distintas formas.** (Spanish.) V.

Chemistry—Analytical and Inorganic

Gómex Aranda and J. Auría Arbuniés. *Combustibles*, v. 14, no. 74, July-Aug. 1954, p. 171-180.

Investigates presence of S as pyrites and iron sulfates. Tables, graphs. 10 ref.

3364* Oxidation Reactions of Calcium Silicides. **Les réactions d'oxydation des siliciures de calcium.** (French.) André Chrétien, William Freundlich, and Michel Bichara. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1045-1047.

Thermogravimetric study of the oxidation of $CaSi_2$, CaSi, and Ca_2Si by gaseous O. Radiocrystallographic analysis of products formed. Graphs.

3365 Analysis of Electroplating Solutions. II. Estimation of Boric Acid in the Presence of Nickel and Ammonium Salts. M. R. Verma and K. C. Agrawal. *Electroplating and Metal Finishing*, v. 7, Dec. 1954, p. 458-459.

Tables of results of the boric acid determination in different combinations. Tables.

3366 Analysis for Industry. T. S. West. *Industrial Chemist and Chemical Manufacturer*, v. 30, Nov. 1954, p. 550-552.

Discusses the separation of Nb and Ta by means of solvent extraction. Tables. 13 ref.

3367 Absorptiometric Determination of Molybdenum in Iron and Steel. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 356-359.

Includes tables. 2 ref.

3368* Insecticide Determination. Colorimetric Determination of O,O-Dialkyl l-Hydroxyphosphonates Derived From Chloral. Paul A. Giang, W. F. Barthel, and S. A. Hall. *Journal of Agricultural and Food Chemistry*, v. 2, Dec. 8, 1954, p. 1281-1284.

Includes graphs, diagram, tables. 5 ref.

3369 Sampling Liquid Steel for Oxygen Content: A Further Evaluation of the Bomb Technique. S. Gilbert and G. R. Bailey. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Dec. 1954, p. 1383-1385.

Close agreement with earlier evaluation confirms validity of sampling method. Tables, graph. 2 ref.

3370 Application of Infrared Spectroscopy to the Determination of Impurities in Titanium Tetrachloride. Rolf B. Johannesen, Charles L. Gordon, James E. Stewart, and Raleigh Gilchrist. *Journal of Research, National Bureau of Standards*, v. 53, Oct. 1954, p. 197-200.

Identification and limits of detection determined by adding known amounts of certain substances to pure $TiCl_4$ and the spectrum measured in the range of 2 to 15μ. Diagrams, tables, infra-red spectrogram. 10 ref.

3371* Determination of the Zirconium Content of Various Bauxites by Spectroscopy. **Bauxitfajták cirkontartalmának meghatározása színképelemzéssel.** (Hungarian.) Tivadarné Kotsis. *Kohászati Lapok*, v. 9, no. 11, Nov. 1954, p. 512-514.

Includes graph, table. 8 ref.

3372* The Determination of Magnesium in Metallic Titanium. **Magnézium meghatározása fémtitánban.** (Hungarian.) Istvánné Sajó. *Kohászati Lapok*, v. 9, no. 11, Nov. 1954, p. 515-516.

Method based on volumetric analysis. Tables. 4 ref.

3373* Metallic Electrodes for pH Measurement. II. Practical Aspects. J. Jackson. *Laboratory Practice*, v. 3, Dec. 1954, p. 496-500.

Applications of Sb and quinhydrone electrodes. Tables. 23 ref.

3374* New Photometric Determination of Iron in the Analysis of Copper Alloys. **Neue photometrische Eisenbestimmung bei der Analyse von Kupferlegierungen. II.** Specifications on the Determination of Iron in Copper Alloys. **Arbeitsvorschrift für die Eisenbestimmung in Kupferlegierungen.** (German.) W. Nielsch and G. Böltz. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 866-868.

Includes graph, tables. 2 ref.

3375* Periodic Processes in the Spark Discharge From Beryllium Bronze. **Periodische Vorgänge beim Abfunken von Berylliumbronze.** (German.) Franz Rosendahl and Heinrich Kaiser. *Naturwissenschaften*, v. 41, no. 21, Nov. 1954, p. 497.

Variations in the intensity of spectrum lines of spark discharge from a Be-Cu electrode ascribed to periodically changing states of oxidation. Table, graphs. 4 ref.

3376* Studies in the Use of the Manganese Dioxide Electrode in Acid—Base Titrations. (English.) I. M. Issa and E. A. Sadek. *Recueil des travaux chimiques des Pays-Bas*, v. 73, nos. 9-10, Sept.-Oct. 1954, p. 853-859.

Electrodeposited MnO_2 on a Pt substrate replaces the H electrode in neutralization titrations. Graphs, table. 8 ref.

3377* Analysis of Highly Pure Aluminum With Special Consideration of the Requirements of Industry. **Die Analyse des Reinstaluminiums unter besonderer Berücksichtigung der Anforderungen aus der Praxis.** (German.) F. E. Faller. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 7, no. 11, Nov. 1954, p. 473-479; disc., p. 479.

Review of literature on old and new methods of determining trace impurities in pure Al. Table, graphs. 17 ref.

3378* The Manganese Bands and Their Separation in the Luminescence Spectrum of Calcium Silicate (Mn, Pb). **Die Manganbaden und ihre Trennung im Lumineszenzspektrum von Calciumsilikat (Mn,Pb).** (German.) Horst Lange. *Zeitschrift für Physik*, v. 139, no. 3, 1954, p. 346-357.

Experimental study and effect of temperature and concentration on Mn emission. Graphs, table. 6 ref.

3379* Quantitative Determination of Aliphatic Alcohols by Colorimetry in the Ultra-Violet Spectrum. **Kolichestvennoe opredelenie spirtov alifaticheskogo riada kolorimetrirovaniem v ul'trafioletovoi oblasti spektra.** (Russian.) S. A. Shchukarev, S. N. Andreev, and I. A. Ostrovskaia. *Zhurnal Analiticheskoi Khimii*, v. 9, no. 6, Nov.-Dec. 1954, p. 354-358.

Includes tables, graphs. 16 ref.

3380* Microquantitative Determination of Carbon, Particularly in TaC. **Mikrokolichestvennoe opredelenie ugleroda, v chastnosti, v karbide tantala.** (Russian.) V. I. Smirnova and B. F. Ormont. *Zhurnal Analiticheskoi Khimii*, v. 9, no. 6, Nov.-Dec. 1954, p. 359-363.

Includes tables, diagram. 3 ref.

3381* Reactions in Solutions Between Zirconium Nitrate and Iodates of Alkaline Metals. **O reaktsiiakh v rastvorakh mezhdu nitratom tsirkoniia i iodatami shchelochnykh metallov. III.** Influence of Alkaline Metals on Properties of Zirconium Iodate and Reactions During the Formation of Deposits. **O vliianii shchelochnykh metallov na sostav iodata tsirkoniia i o reaktsiiakh pri obrazovanii osadkov.** (Russian.) M. I. Konarev and A. S. Solovkin. *Zhurnal Obshchei Khimii*, v. 24, no. 11, Nov. 1954, p. 1901-1910.

Includes tables. 3 ref.

Books and Miscellaneous Publications

3382 Isotopic Gas Analysis for Biochemists. R. F. Glascock. 247 p. 1954. Academic Press, New York. (QH324 G46)

This laboratory manual carries details of current technique and the author's own contributions.

3383 Chromatographic Methods of Inorganic Analysis. F. H. Pollard and J. F. W. McOmie. 192 p. 1953. Academic Press, New York. (QD77 P76c)

Extensive, easily understood, working details for the use of chromatography.

See also:

3215 (identification of soil components)
3243 (analysis of penicillins)
3471 (polarography of As)
3491 (electrochromatography)
3492 (analysis of tetrazole derivatives)

3941 (chromatographic analysis)
3944 (analytical weights)
3971 (analysis of lubricants)
3972 (analysis of lubricants)
4453 (analysis of sulfur)
4562 (infra-red spectroscopy)
4619 (determination of NO_2)

CHEMISTRY—ORGANIC

3384* **The Presence of Interchain Links Between Hydroxy and Keto-Imide Groups in Collagen.** (English.) K. H. Gustavson. *Acta Chemica Scandinavica*, v. 8, no. 7, 1954, p. 1299-1301.

9 ref.

3385* **Studies on Antimetabolites. III. Synthesis of "*Neo*histamine", the β,β-Dimethyl Analogue of Histamine. IV. Synthesis of the α,α-Dimethyl Analogue of (+)-Panthothenic Acid.** Åke Jönsson. **V. Improved Reduction of α-Oximino-β-Phenyl*iso*valeric Acids.** (English.) E. Duintjer and Å. Jönsson. *Acta Chemica Scandinavica*, v. 8, no. 8, 1954, p. 1389-1393, 1491-1493.

Neo-histamine made by reducing α-4(5)-imidazole*iso*butyramide with $LiAlH_4$. 18 ref.

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For leucine, aspartic, and gultamic acids. Silver salts are used. 13 ref.

3387 The Synthesis and Properties of 6-Chloropurine and Purine. Aaron Bendich, Percy J. Russell, Jr., and Jack J. Fox. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6073-6077.

Prepared by two new routes. Physical and chemical properties. Tables, ultra-violet spectrograms. 40 ref.

3388 Cyclic End Groups in Polyamide Resins. Dwight E. Peerman, Wesley Tolberg, and Harold Wittcoff. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6085-6086.

Indicated by infra-red spectrograms on drying oils and polyamines, not on ethylenediamine resins. Table, graph. 9 ref.

3389 Studies on Lignin and Related Products. X. Further Studies on the Isolation of Compounds From Lignin Oxidation Mixtures by Chromatographic Techniques. Irwin A. Pearl and Donald L. Beyer. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6106-6108.

Includes table, diagram. 6 ref.

3390 Studies in the Naphthalene Series. I. Oxidative Coupling of 1-Naphthol. J. D. Edwards, Jr. and J. L. Cashaw. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6141-6143.

Binaphthol and ethers; ultra-violet absorption data. 14 ref.

3391 The Effect of Nuclear Substituents on the Ionic Reactions of Substituted Styrenes. I. The Reaction of Active Methylene Compounds With *o*-, *m*- and *p*-Nitrostyrene. Wesley J. Dale and Charles W. Strobel. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6172-6174.

Reaction of sodio enolates with *o*- and *p*-nitrostyrenes for Michael-type adducts. *m*-Nitrostyrene and styrene do not react. Tables. 8 ref.

3392 The Iodide Ion Exchange Reaction With 2-Haloethyl Alkyl Ethers and *n*-Butyl Bromide. Frank B. Tutwiler and R. L. McKee. *American Chemical Society, Journal*, v. 76, Dec. 20, 1954, p. 6342-6344.

Determined at 15, 25, and 35 C. Tables. 20 ref.

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Includes table. 12 ref.

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Thorough, and rapid method utilizes aniline black. Tables, graphs, structural formulas. 15 ref.

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See also:

3214 (chemistry of fungi)
3254 (chemistry of proteins)
3256 (chemistry of proteins)
3340 (composition of fatty acids)
3379 (analysis of alcohols)
3533 (photolysis of methyl bromide)
3579 (autoxidation of fatty esters)
3580 (photochemical oxidation)
3581 (inedible fats and acids)
3639 (condensation of melamine resins)
4589 (reductive amination of polyketones)
4590 (synthesis and polymerization of ethylenesulfonic acid)
4594 (copolymerization)
4603 (chemistry of epoxy resins)
4626 (detergent efficiencies)

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Mixed electrolytes with acetic acid are studied relative to Brønsted's and Debye-Hückel's concepts. Tables, graphs. 28 ref.

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3466* **The Solubility of Carbon Dioxide, Oxygen, Carbon Monoxide and Nitrogen in Polar Solvents.** (English.) J. Chr. Gjaldbaek and Erik Krogh Andersen. *Acta Chemica Scandinavica*, v. 8, no. 8, 1954, p. 1398-1413.

Most work is with CO_2 and CO; solvents used are toluene, chloroform, 1,2-dibromethane, chlorobenzene, *n*-propyl acetate, aniline, methyl acetate, pyridine, benzyl cyanide, acetone, propionitrile, and nitrobenzene. Compares results. Tables, graphs. 80 ref.

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3468* **Studies on Ionic Solutions in Diethyl Ether. V. Redox Titration of Positive Triphenylmethyl Ion With Negative Triphenylmethyl Ion.** (English.) Christina Mannerskantz and Lars Gunnar Sillén. *Acta Chemica Scandinavica*, v. 8, no. 8, 1954, p. 1466-1477.

Uses 2 C $LiClO_4$-ether (an unstable system) to study the triphenylmethyl ion, R^+ and the ion, R^-($R = (C_6H_5)_3C$). Diagrams, graphs. 16 ref.

3469 Electrolyte—Solvent Interaction. IV. Tetrabutylammonium Bromide in Methanol-Carbon Tetrachloride and Methanol-Heptane Mixtures. V. Tetrabutylammonium Bromide in Ethanol-Carbon Tetrachloride Mixtures. VI. Tetrabutylammonium Bromide in Nitrobenzene-Carbon Tetrachloride Mixtures. Hussein Sadek and Raymond M. Fuoss. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 5897-5909.

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Spectroscopic, polarographic, and pH studies suggest a chelate formation. Graphs. 6 ref.

3556 Self-Diffusion of Cations, Non-Exchange Anions and Solvent in a Cation Exchange Resin System. Marvin Tetenbaum and Harry P. Gregor. *Journal of Physical Chemistry*, v. 58, Dec. 1954, p. 1156-1163.

Polystyrenesulfonic acid is studied by isotopic techniques. Tables, graphs. 14 ref.

3557* Dependence of Colloidal Solubility of Some Organic Liquids on Concentration of Solvent. **Zavisimost' kolloidnoi rastvorimosti nekotorykh organicheskikh zhidkostei ot kontsentratsii rastvoriaiushchego veshchestva.** (Russian.) Z. N. Markina, K. A. Pospelova, and P. A. Rebinder. *Kolloidnyi Zhurnal*, v. 16, no. 5, Sept.-Oct. 1954, p. 366-375.

Investigates solubility of liquid hydrocarbons and polar compounds in K- and Na- oleate solutions. Tables, graphs, diagram. 16 ref.

3558* Diffusion of Different Substances Through Hydrate-Cellulose Films. **Diffuziia razlichnykh veshchestv cherez gidrattselliuloznye plenki.** (Russian.) A. B. Pakshver and I. V. Bykova. *Kolloidnyi Zhurnal*, v. 16, no. 5, Sept.-Oct. 1954, p. 381-386.

Diffusion velocity, under different conditions; relation between diffusor and film. Tables. 6 ref.

3559* Stability and Thixotropy of Montmorillonite Suspensions. **Über die Stabilität und Thixotropie der Montmorillonitsuspensionen.** (German.) A. Buzágh. *Kolloid-Zeitschrift*, v. 139, nos. 1-2, Nov. 1954, p. 74-80; disc., p. 81.

Effects of amount and particle size of suspended material and type of electrolyte on H-ion concentration, vol. of sediment, equivalent conductivity, and cataphoric rate of particle migration. Graphs, tables.

3560 On the Absorption Spectra of Complex Ions. I-II. (English.) Yukito Tanabe and Satoru Sugano. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 753-779.

Includes tables, graphs. 47 ref.

3561* The Structure of Selenium Tetrachloride in the Solid and of Tellurium Tetrachloride in the Liquid and the Solid State. (English.) H. Gerding and H. Houtgraaf. *Recueil des travaux chimiques des Pays-Bas*, v. 73, nos. 9-10, Sept.-Oct. 1954, p. 737-747.

Presents Raman spectral data for $SeCl_4$ and $TeCl_4$. Analogy with $AsCl_3$ cited. Tables. 30 ref.

3562* The Steady-State Temperature Difference in the Hill-Baldes Technique. (English.) B. R. Y. Iyengar. *Recueil des travaux chimiques des Pays-Bas*, v. 73, nos. 9-10, Sept.-Oct. 1954, p. 789-796.

Discusses method and suggests it for mol. wt. determination. Tables, diagram, circuit diagram. 10 ref.

3563 New Carbon Adsorbents. John Jervis Kipling. *Research*, v. 7, Dec. 1954, p. 472-475.

New uses; specific properties; future research; possible economic factors related to use of proposed new materials. 15 ref.

3564 Determination of Atomic Masses by Microwave Spectroscopy. S. Geschwind, G. R. Gunther-Mohr, and C. H. Townes. *Reviews of Modern Physics*, v. 26, Oct. 1954, p. 444-455.

Includes diagrams, graph, tables. 48 ref.

3565* Recent Aspects of the Periodic Classification. **Aspects récents de la Classification périodique.** (French.) Robert Delhez. *Revue universelle des mines*, v. 10, ser. 9, no. 11, Nov. 1954, p. 679-682.

Modifications regarding at. wt., isotopes, presentation, new elements, and the actimides. Tables. 47 ref.

3566 Report of Symposium V. Aerosols. *U. S. Department of Commerce, Office of Technical Services*, PB 111411, June 1953, 145 p. (T21 Un3r)

Eight papers covering condensation nuclei; particle size; anisokinetic sampling; smokestack problem through wind tunnel models; synergistic effects; physical and biological behavior; aggregation; and polydispersity measurement. Diagrams, graphs, tables, micrographs, photographs. 81 ref.

3567 Properties of Solutions in the Neighborhood of the Critical Temperature of the Solvent. Sidney W. Benson, Charles S. Copeland, Peter E. M. Allen, James K. Fogo, and David Pearson. *U. S. Department of Commerce, Office of Technical Services*, PB 111422, Aug. 1953, 119 p. (T21 Un3r)

Principal work on the NaCl-H_2O system but NaI-CH_3OH and other organic systems are considered. Tables, graphs, circuit diagram. 44 ref.

3568* Space and Time Considerations in Physics, Especially Crystal Physics.) **Räumliche und zeitliche Asymmetriebetrachtungen in der Physik, insbesondere der Kristallphysik.** (German.) H. Zocher. *Zeitschrift für Physik*, v. 139, no. 2, 1954, p. 147-162.

Discusses the asymmetry of 32 crystal classes, physical magnitudes, electrical and magnetic fields, charges, and conductivities. Tables. 16 ref.

3569* The Sensitized Fluorescence in Organic Crystalline Solid Solutions. **Die sensibilisierte Fluoreszenz in organischen Mischkristallen.** (German.) Hans Christoph Wolf. *Zeitschrift für Physik*, v. 139, no. 3, 1954, p. 318-327.

Explanation of the fluorescent behavior of some solid solutions of the naphthalene-tetracene system, in which the light energy absorbed by the solvent is transmitted to the solute. Diagram, graphs. 15 ref.

3570* Mechanism of Incomplete Oxidation of Benzene. **O mekhanizme nepolnogo okisleniia benzola.** (Russian.) I. I. Ioffe. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 9, Sept. 1954, p. 1555-1561.

Develops a new mechanism of the vapor-phase oxidation with the formation of phenol, based on the chain character of the process and the participation of phenyl and peroxide radicals. Table. 6 ref.

3571* Kinetics of the Decomposition of Ammonia on Catalysts of Different Nature. **Kinetika razlozheniia ammiaka na katalizatorakh raznoi prirody.** (Russian.) M. T. Rusov and Ts. V. Pevzner. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 10, Oct. 1954, p. 1765-1769.

Experiments on quartz and on Cu and Fe foil. Temperature factor. Graphs, table, diagram. 9 ref.

3572* Experimental Verification of the Theory of Crystal Growth and the Relation Between Equilibrium and Growth Structures. **Eksperimental'naia proverka teorii rosta kristallov i sviaz' ravnovesnykh form s formami rosta.** (Russian.) V. I. Danilov and V. I. Malkin. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 10, Oct. 1954, p. 1837-1844 + 1 plate.

Equipment and procedure. Linear rate of growth and recooling. Graphs, diagrams, micrograph. 8 ref.

3573* Phase Decomposition in the Absence of a Solvent. **Obmennoe razlozhenie v otsutstvie rastvoritelia. II.** Quaternary Reciprocal System Consisting of Lithium and Potassium Chlorides, Sulfates, and Tungstates. **Chetvernaia vzaimnaia sistema iz khloridov, sul'fatov i vol'framatov litiia i kaliia.** (Russian.) A. G. Bergman, A. I. Kislova, and V. I. Posypaiko. *Zhurnal Obshchei Khimii*, v. 24, no. 10, Oct. 1954, p. 1722-1730.

Includes tables, graphs, phase diagrams. 3 ref.

3574* Dehydration of a Mixture of Isopropyl Alcohol and Water on Nichrome. **Degidratatsiia smesi izopropilovogo spirta s vodoi na nikhrome.** (Russian.) N. Z. Kotelkov. *Zhurnal Prikladnoi Khimii*, v. 27, no. 10, Oct. 1954, p. 1090-1093.

Experimental verification of Bork's equation for dehydration of alcohol of the homolog series $C_nH_{2n+2}O$. Tables, graph. 10 ref.

3575* Problem of Dendrite Hypothesis of Carbon Deposit During Catalysis on Metallic Catalysts. **K voprosu o dendritnoi gipoteze otlozheniia uglia pri katalize na metallicheskikh katalizatorakh.** (Russian.) N. Z. Kotelkov. *Zhurnal Prikladnoi Khimii*, v. 27, no. 11, Nov. 1954, p. 1221-1227.

Increased catalytic activity results from dendrite formation on Ni-Cr, Ni, and Ni-Cu wires in alcohol decomposition processes. Micrographs. 14 ref.

Books and Miscellaneous Publications

3576 Advances in Catalysis and Related Subjects. W. G. Frankenburg, V. I. Komarewsky, and E. K. Rideal, editors. v. VI. 467 p. 1954. Academic Press, New York. (QD501 A95c)

A collection of seven papers by different authors covering interfacial catalysis, polymerization, petroleum cracking, and acidic and basic catalysis.

See also:

3404 (activation energies of methyl radicals)
3417 (fluorescence of spectra)
3454 (catalytic action of $AlCl_3$)
3807 (adsorption on metal and semiconductors)
4521 (infra-red spectra)
4522 (structures and π electron spectra)
4540 (Raman effect in binary liquid mixtures)
4581 (structure of molecules)
4588 (side chain crystallization)
4601 (statistical mechanics of linear polymers)

COATINGS

3577* Painting Wood With Aluminum. **Aluminium-Anstriche auf Holz.** (German and French.) P. Urech and P. Douady. *Aluminium Suisse*, v. 4, no. 6, Nov. 1954, p. 203-208.

Studies the effectiveness of Al coatings. Photographs, diagrams, tables.

3578 Saponification Value Determination of Difficultly Saponifiable Drying Oil Products. John N. Shaw and Marvin W. Formo. *American Oil Chemists' Society, Journal*, v. 31, Nov. 1954, p. 448-451.

System of n-butyl alcohol-KOH-5% water is preferred. Some ethyl alcohol helps during titration. Tables, graphs. 9 ref.

Coatings

3579 Formation of Peroxides in Fatty Esters. II. Methyl Linoleate: Application of the Polarographic and Direct Oxygen Methods. C. Ricciuti, C. O. Willits, C. L. Ogg, S. G. Morris, and R. W. Riemenschneider. *American Oil Chemists' Society, Journal,* v. 31, Nov. 1954, p. 456-459.

Autoxidation at 80 C forms hydroperoxides with a continuous decrease in unsaturation. Table, graphs. 6 ref.

3580 Photochemical Oxidation of Fatty Acid Esters With and Without Chlorophyll. Ultraviolet and Infrared Studies of Products. N. A. Khan, W. E. Tolberg, D. H. Wheeler, and W. O. Lundberg. *American Oil Chemists' Society, Journal,* v. 31, Nov. 1954, p. 460-466.

Methyl oleate and linoleate primarily formed monomeric peroxides while retaining unsaturation. Reviews *cis-trans* results. Tables, infra-red spectra. 41 ref.

3581 Lectures of the 1954 Short Course on Inedible Fats and Fatty Acids. *American Oil Chemists' Society, Journal,* v. 31, Nov. 1954, p. 485-600.

Twenty-four papers by several authors on development, control, and utilization of such oils and fats. Many pictorial aids. 541 ref.

3582 Toward a Better Understanding of the Structure of Bodied Oils. Jean Petit. *American Paint Journal,* v. 39, Dec. 6, 1954, p. 32, 34, 36, 38.

Discussion of the polymerization of drying oils. 7 ref.

3583 Vinyl Dispersion Resin Coatings—Organosols and Plastisols. V. L. Larson. *American Paint Journal,* v. 39, Dec. 6, 1954, p. 64 + 10 pages.

Includes micrographs, graphs, diagrams, tables.

3584 Stress—Strain Properties of Films of Pigmented or Emulsified Alkyds. Wouter Bosch, Frank J. Macekonis, and Patrick H. Martin. *American Paint Journal,* v. 39, Dec. 13, 1954, p. 75 + 11 pages.

Investigates the influence of emulsification upon the tensile strength and elongation of a varnish. Graphs, tables, diagrams, photograph. 10 ref.

3585 Fundamentals of Paint, Varnish, and Lacquer Technology. Chap. XIII. Other Exterior Finishes. III. Elias Singer. *American Paint Journal,* v. 39, Dec. 20, p. 62 + 4 pages.

Graphite paint, colors in oil, roof coatings, and caulking and glazing compounds. Tables.

3586 Vinyl Acetate Copolymers and Externally Plasticized Polyvinyl Acetate in Water-Based Paints. Norman G. Tompkins. *American Paint Journal,* v. 39, Dec. 27, 1954, p. 60, 62, 64.

Water-based exterior paints.

3587 Fundamentals of Paint, Varnish, and Lacquer Technology. Chap. XIV. Industrial and Special Maintenance Finishes—Air Dry. I. Elias Singer. *American Paint Journal,* v. 39, Jan. 10, 1955, p. 68, 70, 72-73.

Venetian blind, machinery, and bulletin finishes.

3588* Siliconizing of Steel as a Solid-State Reaction. **Die Insilizierung von Stahl als Reaktion im festen Zustand.** (German.) Erich Fitzer. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 455-463.

Literature review and experiments show that it is not possible to form an acid-resistant, adherent, nonporous protective film by solid reaction of steel with Si. Diagrams, graphs, table, micrographs, photographs. 49 ref.

3589 Paints in 1954. Harry Burrell. *Chemical and Engineering News,* v. 33, Jan. 3, 1955, p. 20-21.

Apparatus, new products, and raw materials. Photograph.

3590* Hard Surfacing With Chromium Boride Alloys. *Chemical & Process Engineering,* v. 35, Dec. 1954, p. 395.

Application of the several alloys. Photographs.

3591* Paint Faults and Remedies. VI. H. Courtney Bryson. *Corrosion Prevention and Control,* v. 1, Dec. 1954, p. 606-611.

Twelve factors affecting the lack of durability of paints under different conditions. Photograph.

3592 Zinc-Rich Paints. C. Finlay and C. T. Morley-Smith. *Corrosion Technology,* v. 1, Dec. 1954, p. 383-385.

Formulation; application methods; film properties; uses; Zn dust requirements. Tables, photographs, mircograph.

3593* Aluminum Coating on Steel Cuts Corrosion. *Diesel Power,* v. 32, Dec. 1954, p. 29-31.

Provides low-alloy steels with exceptional resistance to chemical and high-temperature corrosion. Ability to treat shapes, after casting or fabrication, promises many advantages in improving life of certain diesel parts. Photographs, table.

3594 Vinyl-Coated Steel Housings for Business Machines. G. H. Kress. *Electrical Manufacturing,* v. 54, Dec. 1954, p. 115-119.

Characteristics, design problems, and applications of new composite materials. Table, photograph, diagrams.

3595 The Adhesion of Paints to Metallic Surfaces. C. D. Lawrence. *Electroplating and Metal Finishing,* v. 7, Dec. 1954, p. 461-465.

Adhesion tests; mechanism of adhesion; use of impact and deformation tests. Diagrams, photographs. 8 ref. (To be continued.)

3596* Use of Metallizing in the Chemical Industry. **El uso de la metalizacion en la industria quimica.** (Spanish.) Howard Vanderpool. *Fusion de Metales,* v. 16, no. 6, Nov.-Dec. 1954, p. 25-28.

Use of metallizing coatings on equipment used in the chemical industry as protection against corrosion and to avoid contamination of the product. Table.

3597* Some Metallurgical Aspects on the Enamelling of Cast Iron. **En metallurgs synpunkter på emaljering av gjutjärn.** (Swedish.) B. Thyberg. *Gjuteriet,* v. 44, no. 10, Oct. 1954, p. 165-169.

Effects of composition on enamelling properties. Causes of various defects. 10 ref.

3598* Structure of Phosphate Coatings at High Temperatures. **Struktura fosfátových povlaků za vyšších teplot.** (Czech.) Miroslav Čermák. *Hutnické Listy,* v. 9, no. 8, Aug. 1954, p. 470-474.

X-ray study of $Zn_3(PO_4)_2$ coatings. Structures after heating. Diagram, tables, refractograms, graphs. 6 ref.

3599 Finishing Parts for Military Airplanes. L. M. Redinbaugh. *Industrial Finishing,* v. 31, Dec. 1954, p. 36 + 6 pages.

Facilities for cleaning and applying protective coatings on Al alloy parts of various shapes and sizes. Photographs.

3600* Applications of Chlorinated Rubber Paints. *Industrial Finishing (London),* v. 7, Nov. 1954, p. 248-254.

Properties, formulations, uses, and specialties are tabulated.

3601* Protection by Phosphatising. *Industrial Finishing (London),* v. 7, Nov. 1954, p. 255 + 5 pages.

Describes industrial application processes for steel and Zn. Photographs.

3602* Ultrasonic Processing of Coatings. Thomas A. Dickinson. *Industrial Finishing (London),* v. 7, Nov. 1954, p. 266, 268, 274.

Capabilities of process in dispersion, cleaning, and other industrial applications. Photographs.

3603 Recent Advances in Tinplate Manufacturing Processes. W. E. Hoare. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 12, 1954, 16 p. + 2 plates. (TS670 E25j)

Production of continuous strip steel, electrolytic tinning, and improvements in hot tinning. Photographs, diagrams, table, graph. 8 ref.

3604 Automotive Organic Finishing. James T. O'Reilly. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 19, v. 31, 1954, 15 p. + 4 plates. (TS670 E25j)

General methods, special applications, and future possibilities. Photographs. 1 ref.

3605 Infra-Red Stoving for Paint Finishes. J. Tole, Savart, and L. Hulin. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 20, v. 31, 1954, 10 p. (TS670 E25j)

Drying of synthetic enamels on automobiles.

3606 Organic Finishes on Electroplated Coatings With Special Reference to Adhesion. E. C. J. Marsh. *Institute of Metal Finishing, Transactions, Advance Copy no.* 22, v. 31, 1954, 16 p. (TS670 E25j)

Effects of various pretreatments for lacquering or enameling on Zn, Cd, Cu, Sn, Ni, Cr, Ag, and Au. Tables. 2 ref.

3607 Steam Oxidizing Provides Better Paint Base. L. E. Raymond. *Iron Age,* v. 175, Jan. 13, 1955, p. 75-77.

Low cost surface treatment for steel and cast iron parts. Photographs.

3608 The Protective Properties of Various Phosphate Coatings on Steel. J. F. Andrew, S. G. Clarke, and E. E. Longhurst. *Journal of Applied Chemistry,* v. 4, Nov. 1954, p. 581-595.

Compares phosphates of Fe, Mn, and Zn on steel. A Russian spot-test evaluation is described. Photographs, tables, graphs, micrographs. 9 ref.

3609* Flowability and Critical Volume of Pigment in the Paint Industry. **Fliessfähigkeit und kritisches Pigmentvolumen in der Anstrichmittelindustrie.** (German.) Gerhard Zeidler and Gerhard Eberle. *Kolloid-Zeitschrift,* v. 139, nos. 1-2, Nov. 1954, p. 115-120.

Review of research on factors which affect the applicability of paints. Photographs, graphs, tables. 5 ref.

3610* Vacuum Metallizing—New Low-Cost Method of Finishing Metal Products. J. Gordon Seiter. *Machine and Tool Blue Book,* v. 49, Dec. 1954, p. 157-168, 170, 172.

Fundamentals, advantages, limitations, recent developments, and new applications of this versatile process. Photographs.

3611 Neoprene. Is It the Best All-Around Organic Coating? R. B. Seymour. *Materials & Methods,* v. 40, Dec. 1954, p. 93-95.

Ten important criteria for protective coatings exposed to chemical splash and fumes. Tables, photographs.

3612 Clad and Precoated Metals. Materials & Methods Manual No. 111. John B. Campbell. *Materials & Methods,* v. 40, Dec. 1954, p. 113-128.

Types of materials; advantages and applications; properties, fabrication, and costs. Photographs, tables.

3613* A Survey of Chromate Treatments. Walter E. Pocock. *Metal Finishing,* v. 52, Dec. 1954, p. 48-51.

Details of treatments for Zn, Cd, Cu, Al, Mg, and their alloys. Photograph. 18 ref. (To be concluded.)

3614* Influence of the Rate of Withdrawal on the Thickness of the Zinc Film. **Influence de la vitesse de retrait sur l'épaisseur du film de zinc.** (French.) A. Gordet. *Métallurgie et la construction mécanique,* v. 86, no. 11, Nov. 1954, p. 877, 879, 881.

Effects of galvanizing variables. Tables.

3615 Carbide Flame-Plating in Powder Metallurgy. M. A. Teter. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 68-71; disc., p. 71. (TN695 M56p)

Characteristics and applications.

3616 Painting of Aluminum and Magnesium. Robert I. Wray. *Metal Progress,* v. 66, Dec. 1954, p. 121-126.

Surface preparation, selection of primer and finish coats, and methods of their application. Photographs.

3617* Aluminum Coating Increases Oxidation and Corrosion Resistance of Steel. *Metal Treating,* v. 5, Nov.-Dec. 1954, p. 11.

Alumicoat process permits use of mild and low alloy steel at temperatures above 1800 F. Table, photograph.

3618* Phosphating of Metals. **La phosphatation des métaux.** (French.) Jean Bary. *Métaux, Corrosion-Industries,* v. 29, no. 350, Oct. 1954, p. 399-403.

General review of deep and light phosphating processes. Photographs.

3619 Steel-Container Treatments. II. L. J. Nowacki, E. R. Mueller, and R. H. Dent. *Modern Packaging,* v. 28, Dec. 1954, p. 145-148, 205-206.

Pre-treatment consideration of unlined containers for evaluation of phosphate coatings; reverse-impact and ductility tests to determine the effects of pre-treatments on performance of organic linings. Graphs, tables, photograph.

3620 Testing Latex Paint for Scrubbability and Cleansability. Mark W. Westgate and Marjorie R. Christian. *National Paint, Varnish and Lacquer Association, Inc., Scientific Section, Circular* 767, Dec. 1954, p. 37-58. (TP934 N21c)

Studies made on plate glass for GSA to set up Interim Federal Specification TT-P-0029. Tables, photographs.

3621* Ostwald's Systematics of Pigments in Their Relation to the Young-Helmholtz's Tricomponent Theory. **Die Ostwaldsche Systematik der Pigmentfarben in ihrem Verhältnis zur Young-Helmholtzschen Dreikomponenten-Theorie.** (German.) Helmut Hönl. *Naturwissenschaften,* v. 41, no. 21, Nov. 1954, p. 487-494.

Review of theories and the physics of Ostwald's theory on colors. Diagrams, graphs. (To be continued.)

3622* Creative Imagination as it Applies to the Decorative and Protective Coatings Industry. James S. Long. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 989-1024.

The Mattiello Memorial Lecture covers application of protective coatings theory, pigment vol. studies, and other aspects of progress. Tables, graphs, diagrams, micrographs. 9 ref.

3623* Painting of Plaster Surfaces. II. A. J. Wandersleben. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 1025-1029.

Test plaques of plaster are coated with styrene-butadiene, PVC latex, calcicote, and oleoresinous primers. Results are accelerated by wetting the plaques with dilute caustic. Photographs.

3624* A Study of Primers for Ferrous Metals in an Atmospheric Exposure. VII. Howard Jerome. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 1039-1046.

Tabular data presented from this seven year-old project. Paint formulas.

3625* Systematic Study of Low Odor Alkyd Paints. Carol J. Opp. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 1047-1050.

Shows progress in developing vehicles with less odor. Tables. 5 ref.

3626* Studies on the Formulation of Fire Retardant Paints. R. C. Crippen. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 1059-1061.

Shows that Sb_2O_3 plus chlorinated resins are essential for best performance. Table, graphs.

3627* Polyvinyl Acetate Emulsion Paint Systems. Hugh A. McConaghie, Norman G. Tompkins, O. L. Wheeler, H. L. Jaffe, N. Wellman, John W. Gallagher, L. R. Sherman, and M. C. Londergan. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Dec. 1954, p. 1233-1258; disc., p. 1259-1264.

A panel discussion including five papers. Graph, tables.

Coatings

3628 Amine-Cured Finishes Based on Epoxide Resins. J. J. Zonsveld. *Oil & Colour Chemists' Association Journal*, v. 37, Dec. 1954, p. 670-675.

Metaphenylene diamine and some phenolic resins used for cross-linking. Amines used for final cure. Structural diagrams.

3629* How Many Coats of Paint for Your Product? Leon Sternberg. *Organic Finishing*, v. 15, Dec. 1954, p. 10-13.

Factors governing number of coats required and at what individual and total dry film thickness. Photographs.

3630* Putty, Glazing & Calking Compound Forum. Dan A. Copenhaver and Stanley D. Rogaliner. *Paint Industry Magazine*, v. 69, Dec. 1954, p. 17-19.

Formulation problems reviewed.

3631 Accelerated Weathering Under Various Conditions. Walter Toeldte. *Paint Manufacture*, v. 24, Dec. 1954, p. 419-425.

Claims agreement with natural exposure for six paints in eight different cycles of laboratory tests. Tables, graphs. 7 ref.

3632 The Fire Hazard of Surface Coatings. R. W. Pickard. *Paint Manufacture*, v. 24, Dec. 1954, p. 426-430.

Determined by "flame spread" rate test. Photographs, tables. 10 ref.

3633 Research and Development. Anti-Corrosive and Marine Paints. *Paint Manufacture*, v. 24, Dec. 1954, p. 438-440.

Reviews recent progress in use of metallic pigments in protection of steel marine structures. Specialized systems described. Photographs. 27 ref.

3634 A Large-Scale Electroless Nickel Custom Plating Shop. G. Gutzeit and R. W. Landon. *Plating*, v. 41, Dec. 1954, p. 1416-1420; disc., p. 1420-1421.

Techniques and advantages of chemical deposition of Ni on a variety of base metals. Diagrams, photographs. 3 ref.

3635* Surface Flaws of Zinc Coatings on Steel Sheets. **Wady powierzchniowe powłok cynkowych na blachach stalowych.** (Polish.) S. Socha and W. Sudlitz. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 5, 1954, p. 247-256.

Causes and prevention measures. Micrographs, diagrams, tables. 15 ref.

3636 Nickel Plated Aluminum Sheet. J. H. James and Henry Page. *Product Engineering*, v. 25, Dec. 1954, p. 167-170.

Yield strength increases with plating thickness, endurance strength is unaffected, corrosion resistance varies with environment, and standard forming and heat-treating procedures can be followed very closely. Tables, graphs. 6 ref.

3637* HAE Coatings for Magnesium. H. A. Evangelides. *Product Finishing*, v. 7, Oct. 1954, p. 54-60.

Bath details, preparatory treatments, operating procedure, advantages, and test results of new protective finish. Photographs, diagram.

3638* Marine Finishing Schemes. *Product Finishing*, v. 7, Oct. 1954, p. 72-76, 124.

Fouling problems and corrosion protection for new steel, light alloy, and wooden constructions. Tables.

3639* Melamine Lacquer Resins. **Melaminowe żywice lakiernicze.** (Polish.) J. Brzeziński. *Przemysł chemiczny*, v. 10, no. 7, July 1954, p. 360-364.

Condensation of melamine resins; improvement of lacquers by melamine additions .Tables. 18 ref.

3640* Influence of Resins and Plasticizers on the Properties of Nitrocellulose Lacquer Coatings. **Wpływ żywic i zmiękczacy na zasadnicze własności powłok lakierowych nitrocelulozowych.** (Polish.) M. Taniewski and M. Frycz. *Przemysł chemiczny*, v. 10, no. 11, Nov. 1954, p. 562-564.

Data for various kinds and amounts of plasticizers. Tables.

3641* Allyl-Melamine Ether and Its Use in Air-Drying Alkyd-Resin Lacquers and Lacquer Enamels. **Allyl-Melamin-Aether und deren Verwendung in lufttrocknenden Alkydharz-Lacken und Lack-Emaillen.** (German.) G. Widmer. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 11, Nov. 1954, p. 345-364.

Reviews air-drying properties and behavior in admixture with air-drying alkyd resins in relation to quality, quantity, and manufacture of the ethers. Graphs, tables. 36 ref.

3642* The Problem of Adjusting the Melting Intervals of Ground and Top Enamels in Sheet-Metal Enamelling. **Zur Frage der Abstimmung der Schmelzintervalle von Grund- und Deckemail bei der Blechemaillierung.** (German.) Armin Petzold and Theodor Haase. *Silikattechnik*, v. 5, no. 10, Oct. 1954, p. 426-428.

Experiments on the correlation between fusibility of ground enamel and adhesiveness of top-enamel. Graphs, table, diagrams. 14 ref.

3643 When Metal Weds Plastic—A New Material Is Born. Samuel W. Baker. *Steel*, v. 135, Dec. 6, 1954, p. 116-119.

Precoating of sheet metal provides a vinyl-metal laminate which can be formed by only slight modifications of conventional practices. Photographs, tables.

3644* Reactions in the Intermediate Stratum Between Iron and Coating Systems and the Effect of Inhibitors. **Vorgänge in der Grenzschicht zwischen Eisen und Anstrich sowie deren Beeinflussung durch Hemmstoffe.** (German.) A. V. Blom. *Werkstoffe und Korrosion*, v. 5, no. 11, Nov. 1954, p. 425-429; disc., p. 429-430.

Stresses importance of a special surface technology for prolonging life of steel structures and reducing maintenance costs, by close correlation of surface pre-treatment and coatings. Tables, diagram. 6 ref.

3645 Study of the Solvent Resistance of Formvar Enamels. J. A. Loritsch. *Wire and Wire Products*, v. 29, Dec. 1954, p. 1435, 1438-1439.

Factors influencing solvent resistance. Photographs.

3646 Phosphate Coatings in the Cold Drawing of Steel Wire. James F. Leland. *Wire and Wire Products*, v. 29, Dec. 1954, p. 1440-1443, 1479-1481.

Advantages and possible applications in American installations. Diagrams.

See also:

3257 (colors in porcelain enamels)
3272 (TiO_2 in vitreous enamels)
3339 (determination of monoglycerides)
3433 (coatings research)
3447 (cyclohexanone formaldehyde lacquers)
3692 (coatings for steel structures)
3852 (paint consumption)
3962 (testing of paint films)
4143 (vinyl coatings for castings)
4372 (diffusion coatings)
4649 (paint drying ovens)

CORROSION

3647* Protection Against Corrosion of Light-Metal Constructions. **Über den Korrosionsschutz von Leichtmetall-Konstruktionen im Bauwesen.** (German and French.) W. Sandow. *Aluminium Suisse*, v. 4, no. 6, Nov. 1954, p. 193-198.

Discusses different lacquers and coatings as corrosion inhibitors. Table.

3648 What To Do About Corrosion. Charles Emerson. *American Machinist*, v. 98, Dec. 6, 1954, p. 145-160.

Causes, materials and techniques for control, and prevention. Photographs, diagram.

3649* Corrosion of Copper and Copper Alloy Tubes. D. B. Thompson. *Australasian Engineer*, 1954, Oct., p. 48-56; disc., p. 56-59.

Discusses oxide ionization and cupric ion corrosion; the effects of chlorides, sulfates, sulfides, carbon deposits, ashes, internal stress, and high rate of water flow, dezincification, and other factors contributing to corrosion. Diagrams, micrographs, photographs. 21 ref.

3650 New Metal Corrosion Inhibitor. *Chemical Age,* v. 71, Dec. 4, 1954, p. 1183-1184.

Use of cyclohexylamine carbonate, (CHC).

3651 Lead Lined Plus. *Chemical Engineering,* v. 62, Jan. 1955, p. 230, 232.

Anticorrosive film on Pb liner protected by C or graphite layer. Photograph.

3652* Corrosion of Aluminum Alloys by Exhaust Gases. Fred M. Reinhart. *Corrosion,* v. 10, Dec. 1954, p. 421.

Damage to aircraft wings which are swept by exhaust gases. Photograph.

3653* Nomographs for Making Corrosion Rate Calculations. W. A. Szymanski. *Corrosion,* v. 10, Dec. 1954, p. 422-424.

Easy method of calculating corrosion rates and of converting rates from mg. per day per dm.^{2} to in. penetration per yr. Nomogram.

3654* Aluminum Alloy Heat Exchangers in the Process Industries. W. W. Binger and H. W. Fritts. *Corrosion,* v. 10, Dec. 1954, p. 425-431.

Factors to consider in selecting materials. Service experience with Al in various media. Graphs, table, diagrams, micrograph, photographs. 8 ref.

3655* A Technique for Corrosion Testing in Liquid Lead. John V. Cathcart and William D. Manly. *Corrosion,* v. 10, Dec. 1954, p. 432-434.

Simple apparatus for comparing dynamic corrosion characteristics of various metals. Diagrams, graph, micrographs, photograph. 3 ref.

3656* A Study of Corrosion and Mass Transfer of Nickel by Molten Sodium Hydroxide. Robert A. Lad and Sidney L. Simon. *Corrosion,* v. 10, Dec. 1954, p. 435-439.

Effects of flow variables, temperature, and various additives to metal and caustic. Diagrams, graphs, tables. 2 ref.

3657* Measurement of the Susceptibility of Galvanized Surfaces to Humid Storage Stain. R. A. Neish. *Corrosion,* v. 10, Dec. 1954, p. 440-442.

Evaluation tests. Table, photographs. 11 ref.

3658* Carbon Anodes. Robert Pope. *Corrosion,* v. 10, Dec. 1954, p. 443-444.

Advantages of cored rods for cathodic protection. Table.

3659* Tests and Surveys for Lead Sheathed Cables in the Utilities Industry. *Corrosion,* v. 10, Dec. 1954, p. 445-463.

Summary of replies to questionaire prepared by Task Group 4-B-4 on Tests and Surveys of the NACE. Covers techniques, instrumentation, materials, criteria, and operating routines.

3660* Principles of Corrosion. II. Why Metals Corrode. W. H. J. Vernon. *Corrosion Prevention and Control,* v. 1, Dec. 1954, p. 591-600, 639.

Underground and atmospheric corrosion; direct oxidation reactions; distribution of corrosion in or on metals. Micrographs, graphs, diagrams, photograph. 2 ref.

3661* The Phenomenon of the Disturbance of the Passive State of Stainless Steels in Strongly Oxidizing Solutions. **Iavlenie narusheniia passivnogo sostoianiia nerzhaveiushchikh stalei v sil'no okislitel'nykh rastvorakh.** (Russian.) N. D. Tomashov and G. P. Chernova. *Doklady Akademii Nauk SSSR,* v. 98, no. 3, Sept. 21, 1954, p. 435-438.

Anodic and cathodic polarization of various steels. Graphs. 10 ref.

3662* Mechanism of the Overpassivation of Steels in Oxidizing Media. **Mekhanizm perepassivatsii stalei v okislitel'nykh sredakh.** (Russian.) V. P. Batrakov. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 97-100.

Anodic and cathodic polarization. Mathematical formulas. Graphs. 8 ref.

3663* Anodic Passivation of Iron in Concentrated Sulfuric Acid. **Anodnoe passivirovanie zheleza v kontsentrirovannoi sernoi kislote.** (Russian.) V. M. Novakovskii and A. I. Levin. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 129-132.

Effects of acid concentration and current density on passivation behavior. Diagram, graphs. 9 ref.

3664* Rate of Oxygen Depolarization in the Atmospheric Corrosion of Metals. **O skorosti kislorodnoi depoliarizatsii pri atmosfernoi korrozii metallov.** (Russian.) I. L. Rozenfel'd and K. A. Zhigalova. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 137-140.

Relation of Cu cathode potential to amount of electricity passed at various relative humidities. Graphs. 9 ref.

3665* Reaction of Thallium With Oxygen and Moisture. J. T. Waber and G. E. Sturdy. *Electrochemical Society, Journal,* v. 101, Dec. 1954, p. 583-589.

Investigations in the range 25-75 C to throw light on mechanism of atmospheric corrosion. X-ray diffraction confirms principal reaction product changes from Tl_2O to TlOH. Graphs, tables. 13 ref.

3666 A Survey of Corrosion Inhibitors. A. Bukowiecki. *Engineers' Digest,* v. 15, Nov. 1954, p. 476-479. (From *Schweizer Archiv,* v. 20, no. 6, 1954, p. 169-186.)

Previously abstracted from original. See item 15616, v. 3, Nov. 1954.

3667* Cathodic Protection of Pipe Lines. **Der kathodische Schutz von Rohrleitungen. II.** Use of Cathodic Protection Against Corrosion in Underground Pipe Lines. **Anwendung des kathodischen Korrosionsschutzes bei erdverlegten Rohrleitungen.** (German.) H. Steinrath. *Erdöl und Kohle,* v. 7, no. 11, Nov. 1954, p. 728-730.

Describes equipment used and illustrates layout. Diagrams, table, photograph. 15 ref.

3668* Hydrogen Blisters. Felipe Paredes and W. W. Mize. *Gas,* v. 30, Dec. 1954, p. 89-92.

Causes and methods of prevention in pipe lines. Photographs, diagrams, tables, map. 10 ref.

3669* Improved Techniques in Corrosion Reduction. L. S. Metcalfe. *Gas Age,* v. 114, Dec. 16, 1954, p. 32-34, 70, 72.

New rust inhibitive primers and finishes not only protect against leading factor in deterioration of steel exposed to atmosphere, but also reduce costs. Photographs.

3670* Cathode Protection as a Measure Against Corrosion. **Kathodenschutz als Massnahme gegen Korrosionen.** (German.) W. Ufermann. *Gas- und Wasserfach, Bau und Betrieb,* v. 6, no. 8, Nov. 1954, p. 45-47.

Practical suggestions on designing a cathodic device for protecting water mains. Graphs, diagrams.

3671 Volatile Rust Inhibitors. Hayward R. Baker. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2592-2598.

Reaction products of amines with weak acids are most effective at pH of 7.5 to 8.5. Tables. 55 ref.

3672 Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 77A-78A, 80A.

Describes cleaning of metallic specimens after exposure. Photograph, table.

3673 External Exchangers Stem Chemical and Electrolytic Corrosion. Carl Buck. *Iron Age,* v. 174, Dec. 30, 1954, p. 50-51.

Heat exchangers for cleaning, plating, and pickling tanks. Photographs, table.

3674 The Weathering of Nickel/Chromium Electrodeposits. W. A. Wesley and B. B. Knapp. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 18, v. 31, 1954, 18 p. + 4 plates. (TS670 E25j)

Chromium on top of Ni helps in early stages of industrial atmosphere exposure but may accelerate pitting in later stages. Effects of metal composition, micro-structure, and residual stresses on type of pitting. Tables, photographs, micrographs. 8 ref.

Corrosion

3675 Corrosion-Fatigue Properties of an Aluminium-Magnesium-Silicon Alloy in the Unprotected, Anodized, and Painted Conditions. N. P. Inglis and E. C. Larke. *Institute of Metals, Journal,* v. 83, Dec. 1954, p. 117-120 + 1 plate.

Effects of tap water and 3% NaCl solution. Careful painting gave extremely effective protection. Tables, graphs, diagram, photographs, micrograph. 6 ref.

3676 Fretting Corrosion of Mild Steel in Air and in Nitrogen. I-Ming Feng and Herbert H. Uhlig. *Journal of Applied Mechanics,* v. 21, Dec. 1954, p. 395-400.

Weight loss as a measure of damage; effects of time, humidity, temperature, slip, pressure, and frequency; nature of corrosion products. Graphs, photographs, table, diagram. 18 ref.

3677 Mechanism of Fretting Corrosion. Herbert H. Uhlig. *Journal of Applied Mechanics,* v. 21, Dec. 1954, p. 401-407.

Chemical and mechanical factors involved and an outline of remedial measures. Micrograph, diagram, graph, table. 23 ref.

3678 Anti-Corrosion Practice for Wrought Aluminum Alloys. M. J. Pryor. *Light Metal Age,* v. 11, Dec. 1954, p. 18-21, 33, 41, 46.

Formation and characteristics of oxide films; forms of corrosion; effects of alloy additions. Photographs, micrograph.

3679 Corrosion-Resistant Cast Alloys. E. A. Schoefer. *Machine Design,* v. 26, Dec. 1954, p. 178-186.

A design guide for selecting cast stainless alloys for fabricating characteristics, mechanical properties, and cost. Graphs, photographs, tables. 5 ref.

3680* The Effect of Organic Inhibitors on the Dissolving of Iron in Acids. **Über die Wirkung organischer Inhibitoren auf die Auflösung des Eisens in Säuren.** (German.) J. Elze. *Metalloberfläche,* Ausgabe A, v. 8, no. 12, Dec. 1954, p. 177-179.

Investigations with a redox electrode. The effect of inhibitors in the presence of an oxidizing agent. Tables, graphs. 8 ref.

3681* Distribution of Attack, Voltage, and Currents in Corrosion by Differential Aeration. Research on Zinc. **Distribuzione dell'attacco, delle tensioni e delle correnti nella corrosione per aerazione differenziale. Ricerche sullo zinco.** (Italian.) G. Bianchi and R. Aletti. *Metallurgia italiana,* v. 46, no. 10, Oct. 1954, p. 347-353.

Use of aeration curves and a mathematical model permit calculation of current distributions for various corrosion conditions. Diagrams, graphs, tables. 9 ref.

3682 Corrosion Resistance of Carbo-Nitrided Steel. P. A. Clarkin and M. B. Bever. *Metal Progress,* v. 66, Dec. 1954, p. 108-109.

"Compound layer" reduces corrosion rate in tepid salt solution to half that of carbo-nitrided steel without the layer. Photographs.

3683 Air-Corrosion of Fe-Ni-Cr Alloys. Anton deS. Brasunas. *Metal Progress,* v. 66, Dec. 1954, p. 114B.

Nomograph relating corrosion rate, composition, and temperature.

3684* Corrosion in the Petroleum Industry. III. F. H. Garner and A. R. Hale. *Petroleum,* v. 18, Jan. 1955, p. 12-14.

Methods for testing corroded parts are described. Photographs. 24 ref.

3685 Corrosion Protection of Modern Aircraft. W. F. Castell. *Plating,* v. 41, Dec. 1954, p. 1409-1414; disc., p. 1415.

Protection of Al alloys used in airframes by the Iridite No. 14 process. Photographs, micrographs.

3686* Guard Your H-P Boilers Against These Forms of Corrosion. *Power,* v. 99, Jan. 1955, p. 90-93.

Appearance, location, and cause of corrosion resulting in internal and external deterioration. Photographs, diagrams, table, micrograph.

3687* Stop Losing Your Heating-System Dollars to Corrosion. *Power,* v. 99, Jan. 1955, p. 118-119.

Proper water treatment and a tight system slow down internal corrosion losses, care in pipe laying checks external attack. Oxygen and CO_2 are biggest trouble makers. Table.

3688 The Effect of Composition on the Scaling of Iron-Chromium-Nickel Alloys Subjected to Cyclic Temperature Conditions. H. L. Eiselstein and E. N. Skinner. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 162-172; disc., p. 172. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Scaling was pronounced at 1800 F for alloys with less than 35% Ni and 20% Cr. Photograph, tables, graphs.

3689* Ship and Rust. **Skip og rust.** (Norwegian.) Jan Getz. *Teknisk Ukeblad,* v. 101, no. 38, Oct. 21, 1954, p. 823-830; Oct. 28, no. 39, 1954, p. 855-861.

Report on types and causes of corrosion on ships and evaluation of preventive methods. Photographs, tables, graphs, diagrams. 26 ref.

3690* The Initial Corrosion of Metals in Contact With Aqueous Solutions at Room Temperatures. **Über die Anfangskorrosion der Metalle in Berührung mit wässrigen Lösungen bei Raumtemperatur.** (German.) Fritz Tödt. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 430-433; disc., p. 433.

Differentiates between two types and in both cases it is assumed that a local element is formed, which can be verified by evidences of coating. Tables. 10 ref.

3691* The Application of Electrochemical Methods to the Investigation of Corrosion. **Anwendungen der Elektrochemie auf Korrosionsuntersuchungen.** (German.) Marcel Pourbaix. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 433-440; disc., p. 440.

Series of electrochemical equilibrium diagrams predicts extent of metal corrosion. Polarization curves give information on appropriate protective measures. Diagrams, graphs, circuit diagrams. 25 ref.

3692* The Protection of Steel Constructional Work From Corrosion. **Rostschutz on Stahlbauwerken.** (German.) Karl Krenkler. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 441-451.

Conditions promoting rust formation; cleaning and treatment of metal surfaces; application factors of protective coatings; selection of proper anticorrosive paints. Photographs, diagrams, graphs. 4 ref.

3693 How Inhibitors Work in Subsurface Corrosion. James D. Crawford and Thomas M. Newell. *World Oil,* v. 139, Dec. 1954, p. 191-193, 196.

Mechanics of corrosion in oil wells and the function of the inhibitors in control. Photographs, graph.

3694* Irreversible Potentials and Corrosion Behavior of Manganese. **Neobratimye potentsialy i korrozionnoe povedenie margantsa.** (Russian.) A. Ia. Shatalov and N. I. Isaev. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1562-1571.

Mechanism of corrosion at different pH's, using the method of polarization diagrams. Diagrams, tables. 17 ref.

3695* Protective Potential of Steel. **Zashchitnyi potentsial stali.** (Russian.) N. P. Zhuk. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 10, Oct. 1954, p. 1869-1871.

Mathematical treatment on basis of theory of electrochemical corrosion. 13 ref.

Books and Miscellaneous Publications

3696 Corrosion Problems and Prevention in the Chemical and Petro-Chemicals Industries in the U.S.A. (Technical Assistance Mission No. 130) 129 p. 1954. Organisation for European Economic Co-operation, 2 rue André-Pascal, Paris-16e, France. (TA462 Or3c)

Covers corrosion theory, methods of study, anticorrosive materials, protective coatings, inhibitors, and cathodic protection.

ELECTRICAL ENGINEERING

3697* The Exact Measurement of Alternating Current, Voltage, and Power. **Die genaue Messung von Wechselstrom, -spannung und -leistung. II.** (German.) Felix Angersbach. *Archiv für technisches Messen*, 1954, no. 226, Nov., p. 245-248.

Description of different methods used. Circuit diagrams. 12 ref.

3698* Permanent Control of the Mechanical Operation of Turbines. **Permanente contrôle van de mechanische bedrijfstoestand van turbines. II.** (Dutch.) H. J. Lindenhovius. *Bedrijf en Techniek*, v. 9, no. 213; *Electronica section*, v. 7, no. 160, Oct. 23, 1954, p. 169-171.

Control equipment and electrical circuits. Diagrams, graph.

3699 Earthing Electrical Installations. A. G. Thomson. *Chemical Age*, v. 71, Dec. 4, 1954, p. 1198-1200.

British procedure and requirements.

3700* Transitory System in Dielectrics. **Régime transitoire dans les diélectriques.** (French.) Jean Granier and Paul Caillon. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1025-1027.

Investigates relationship existing between the properties of a dielectric subjected either to an alternating field or to a constant field. 5 ref.

3701 Research Progress in Dielectrics—1954. Alex. E. Javitz. *Electrical Manufacturing*, v. 54, Dec. 1954, p. 70-78, 296, 298.

Developments in silicones. Radiation effects on insulating materials. Deterioration and breakdown studies. Photographs, graphs, tables. 6 ref.

3702 Circuit Applications of Voltage-Sensitive Capacitors. James L. Jenkins. *Electrical Manufacturing*, v. 54, Dec. 1954, p. 83-88, 300, 302.

Use of the capacitors for functions usually performed by tubes or transistors. Graphs, diagrams. 6 ref.

3703* Transitional Processes in a System Comprising a Synchronous Machine and an Exciter. **Perekhodnye protsessy v sisteme sinkhronnaia mashina-vozbuditel'.** (Russian.) L. V. Tsukernik. *Elektrichestvo*, 1954, no. 10, Oct., p. 7-15.

Mathematical analysis; advantages of compounding machines; hindering demagnetization and reversal of magnetism. Circuit diagram, graphs, oscillogram, table. 9 ref.

3704* The Problem of the Distribution of a Voltage Throughout a Chain of Insulators. **K voprosu o raspredelenii napriazheniia po girliande izoliatorov.** (Russian.) A. A. Vorob'ev and V. S. Dmitrevskii. *Elektrichestvo*, 1954, no. 10, Oct., p. 75.

More precise measurement of voltage distribution. Equalization of distribution by means of rings. Graphs. 1 ref.

3705* The Problem of Signs in Electrical Magnitudes. **Zur Vorzeichenfrage bei elektrischen Grössen.** (German.) P. Böning. *Elektrotechnik und Maschinenbau*, v. 71, nos. 15-16, Aug. 1, 1954, p. 365-370.

An electric circuit has always at least two magnitudes to be measured in volts, the equilibrium of these magnitudes being expressed by the fact that their vectors always form a closed polygon. Circuit diagrams, vector diagrams. 3 ref.

3706* Effect of Gas Content on the Dielectric Behavior of Insulating Oils. **Einfluss des Gasgehaltes auf das dielektrische Verhalten von Isolierölen.** (German.) H. H. Buchholz. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 22, Nov. 1954, p. 763-768.

Undesirable effect of dissolved gases, impurities, and inhomogenieties in electrode surfaces on insulating properties of oils. Table, diagrams, graphs, photographs. 20 ref.

3707* **Elementary Treatment of the Polyphase Induction Motor.** J. E. Parton and O. K. Gashus. *Engineer*, v. 198, Nov. 12, 1954, p. 656-657.

Compares performance equations derived from the constant-flux and approximate circuits so as to emphasize the errors arising from the use of the former. Circuits, graph, table. 8 ref.

3708 Practical Assessment of Electrical Insulating Varnishes. B. Breunlich. *Engineer's Digest*, v. 15, Dec. 1954, p. 504-506. (From *Elektrotechnik und Maschinenbau*, v. 71, no. 19, Oct. 1954, p. 453-461.)

Considers properties which varnishes are required to possess, and methods by which their suitability can be tested for practical applications. Graphs.

3709 Icing Problems of Electrical Conductors. P. B. Storebo. *Engineers' Digest*, v. 15, Dec. 1954, p. 520-522. (From *Elektroteknisk Tidsskrift*, v. 67, no. 26, Sept. 15, 1954, p. 353-362.)

Classification of ice types and their influence on conductors. Factors to consider in assessing icing conditions. Diagrams. 7 ref.

3710* **Starting of Induction Motors at Frequencies Other Than Normal.** C. S. Ghosh and B. Vasantha Rao. *Indian Institute of Science, Journal*, v. 36, sec. B, Oct. 1954, p. 127-149.

Theoretical characteristics of operation at starting and when running; method of simplifying the equivalent circuit in analysis of double-cage squirrel-cage motor. Graphs, circuit diagrams, diagram. 12 ref.

3711 The Application of the Electrometer Valve to Charge Measurement. M. J. Morant. *Journal of Scientific Instruments*, v. 31, Nov. 1954, p. 391-395.

Measures small static charges without an external grid resistor, with the grid insulator limited only by leakage and grid current. Graphs, circuit diagram. 8 ref.

3712 A Stable and Sensitive D.C. Amplifier With High Input Resistance. S. O. Nielsen and Th. Rosenberg. *Journal of Scientific Instruments*, v. 31, Nov. 1954, p. 401-404.

Description and characteristics of a line-operated amplifier for automatic regulation using a.c. amplification and a breaker modulator. Circuit diagrams, graph. 7 ref.

3713* Equivalence of Two-Pole Circuits. **Zur Äquivalenz von Zweipolschaltungen.** (German.) K. H. R. Weber and Irmgard Schlegel. *Nachrichtentechnik*, v. 4, no. 10, Oct. 1954, p. 430-433.

Mathematical method of deriving equivalent two-poles or proving an equivalence. Diagrams. 3 ref.

3714 Transducers for Measuring Displacement, Velocity, or Acceleration. Robert M. Conklin and Hal M. Morgan. *Product Engineering*, v. 25, Dec. 1954, p. 158-162.

Selection governed by influence of motion characteristics, required accuracy, and desired form of results. Type of use determined by mounting method, accessibility of motion, and dynamic and electrical characteristics. Diagrams, graphs. 3 ref.

3715* **General Properties of Electromagnetic Amplifiers.** D. A. Bell. *Wireless Engineer*, v. 31, Dec. 1954, p. 310-319.

General relations between gain, bandwidth or time-constant, and power rating, together with the effects which may be expected from application of feedback. Circuit diagrams, graphs, table, diagram. 9 ref.

3716* The Effect of Secondary Electrons on the Ignition of High-Frequency Discharges. **Der Einfluss von Sekundärelektronen auf die Zündung von Hochfrequenzentladungen.** (German.) F. Kossel and K. Krebs. *Zeitschrift für Physik*, v. 139, no. 2, 1954, p. 189-196.

Experiments and theoretical considerations. The effect of a static magnetic field on the reduction of ignition voltage in H.F. discharges. Diagram, graphs. 11 ref.

3717* Thermal Electric Arcs of High Temperature and Low Operating Voltage. **Thermische Lichtbögen hoher Temperatur und niedriger Brennspannung.** (German.) G. Busz and W. Finkelnburg. *Zeitschrift für Physik*, v. 139, no. 2, 1954, p. 212-225.

Electrical and spectroscopic investigations in Ar or N_2 at atmospheric pressure and 500 amp. Diagrams, photographs, graphs, table. 10 ref.

3718* Behavior of Polystyrene Condensers Under the Effect of Alternating Voltage. **Povedenie polistirol'nykh kondensatorov pri vozdeistvii peremennogo napriazheniia.** (Russian.)

Electrical Engineering

A. P. Butra and V. T. Renne. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 1974-1982.

Behavior in relation to frequency, voltage, temperature, time, pretreatment, and ionization products. Graphs, table. 5 ref.

Books and Miscellaneous Publications

3719 Statistical Methods in Electrical Engineering. D. A. Bell. 175 p. 1953. Chapman & Hall, London. (QA273 B41s)

Theory and applications of statistics with biases towards continuous or quasi-continuous distributions.

3720 The Electromagnetic Field in Its Engineering Aspects. G. W. Carter. 360 p. 1954. Longmans, Green and Co., New York. (QC760 C24e)

Non-mathematical treatment on the behavior of electromagnetic apparatus; the fundamentals, and a comprehensive view of the theory, with reference to its engineering applications.

3721 Magnetic Control of Industrial Motors. Gerhart W. Heumann. 2nd Ed. 714 p. 1954. John Wiley & Sons, New York. (TK2851 H48m2)

External performance characteristics of all types of industrial motors; components and devices available to the engineer; basic circuits; examination, by illustration, of general and special purpose controllers and their application.

3722 Relays for Electronic and Industrial Control. R. C. Walker. 303 p. 1953. Chapman & Hall, London. (TK2851 W15r)

Reference book of the principal features and potentialities of relays as switching devices.

See also:
3303 (electrical strength of porcelain)
4571 (electrical conductivity)
4614 (dielectric losses in polyethylene)
4669 (cold welding for electrical parts)

ELECTROCHEMISTRY AND ELECTROPROCESSES

3723 Tin-Zinc Plating. *Aircraft Production*, v. 16, Dec. 1954, p. 497-498.

Details of the plating process developed by the Tin Research Institute. Photograph, diagram.

3724* Influence of Additions of Potassium Chloride on the Overvoltage of Copper in Copper Sulfate Solution. **Influence des additions de chlorure de potassium sur la surtension du cuivre en solution de sulfate de cuivre.** (French.) Minko Balkanski. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1381-1383.

Addition of KCl causes decrease of relative energy of activation. Increase of concentration of K^+ ions decreases degree of hydration of Cu^{++} ions. Graphs, table.

3725* Electrolytic Bath With Semiconductor Walls. **Elektrolitícheskaia vanna s poluprovodiashchimi stenkami.** (Russian.) V. E. Bogoliubov and Iu. M. Shamaev. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 423-426.

Formulas for choice of ratio of conductances of the electrolyte and the wall to minimize potential of interferences. Graphs. 5 ref.

3726* The Effect of Ultrasonic Waves on the Electrodeposition of Copper. W. R. Wolfe, Hyman Chessin, Ernest Yeager, and Frank Hovorka. *Electrochemical Society, Journal*, v. 101, Dec. 1954, p. 590-596.

Determination made at frequencies of 200 and 100 kc. per sec. with acid-sulfate plating baths of various concentrations. Effects ascertained in terms of polarization measurements and X-ray diffraction data. Diagrams, graphs, X-ray pattern, Schlieren photographs. 17 ref.

3727 The Scientific Basis of Anodic Oxidation Treatments of Aluminium and Its Alloys. P. Lacombe. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 1, v. 31, 1954, 12 p. + 1 plate. (TS670 E25j)

Electrolytic and structural factors influencing growth and properties of anodic films. Micrographs, photographs, graphs, refractogram. 19 ref.

3728 Industrial Methods of the Brightening and the Anodic Oxidation of Aluminium and Its Alloys. J. F. G. Herenguel. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 2, v. 31, 1954, 11 p. + 2 plates. (TS670 E25j)

Types of alloys and various finishes in commercial use. Typical defects and their elimination. Micrographs, photographs, graphs. 9 ref.

3729 Phosphoric Acid Anodizing of Aluminium and Its Application to Electroplating. R. C. Spooner and D. P. Seraphim. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 3, v. 31, 1954, 18 p. + 5 plates. (TS670 E25j)

Effects of electrolyte concentration, current density, time, temperature, and air agitation on coating wt., metal loss, coating ratio, and density. Tables, graphs, photographs, micrographs. 14 ref.

3730 Electrolytic Polishing and Metal Fatigue. R. Mondon and H. E. Zentler-Gordon. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 4, v. 31, 1954, 13 p. (TS670 E25j)

Electropolishing and electromachining remove compressed layers and reveal true fatigue properties of the metal. Vapor honing can restore the compressed layer. Tables, graphs. 12 ref.

3731 On the Experimental Methods for the Determination of Electrode Polarization. R. Piontelli. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 5, v. 31, 1954, 6 p. (TS670 E25j)

Principles of two arrangements which eliminate errors involved in use of the Luggin-Haber capillary. Diagrams. 6 ref.

3732 Radiotracer Study of Electrochemical Displacement on Metals. M. Simnad, A. Spilners, and Ling Yang. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 6, v. 31, 1954, 6 p. (TS670 E25j)

Factors influencing displacement of Ag from $AgNO_3$ solutions by Cu, Fe, and Ni. Graphs. 5 ref.

3733 Morphology of the Growth of Isolated Crystals in Cathodic Metal Deposits. Hellmuth Fischer and Heinz Felix Heiling. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 7, v. 31, 1954, 13 p. + 4 plates. (TS670 E25j)

Deposition of Ag confirmed that growth layers lie parallel to lines of current. Requirements for formation of FI-type isolated crystals. Tables, photographs, micrographs. 18 ref.

3734 A Quantitative Adhesion Test for Electrodeposited Chromium. C. Williams and R. A. F. Hammond. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 9, v. 31, 1954, 22 p. + 1 plate. (TS670 E25j)

Development and standardization of test. Influence of base material, cleaning methods, plating conditions, and heat treatment on adhesion and strength of deposits on steel. Diagrams, photographs, graphs, tables. 17 ref.

3735 Studies of the Action of Organic Compounds at the Surface During the Electrodeposition of Nickel. Henry Leidheiser, Jr. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 14, v. 31, 1954, 16 p. + 1 plate. (TS670 E25j)

Influence of various compounds on grain size, orientation, and polarization was studied by X-ray, cathode potential, and adsorption studies. Tables, diffractograms, graphs. 7 ref.

3736 Bright Nickel Plating—A Review of Progress. R. B. Saltonstall. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 15, v. 31, 1954, 8 p. (TS670 E25j)

Improvements over past 20 yr. Difficulties still to be overcome. 6 ref.

3737 Tin-Alloy Plating: American Experience. Frederick A. Lowenheim. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 23, v. 31, 1954, 12 p. (TS670 E25j)

Review of practical experience with Sn-Zn, Sn-Ni, and Sn-Cu alloys. 26 ref.

3738 Progress in Tin-Nickel Electroplating. A. E. Davies. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 24, v. 31, 1954, 15 p. (TS670 E25j)

Effects of fluoride concentration and formation of complexes. Suggests modifications of bath compositions. Tables, graphs. 8 ref.

3739 The Electrodeposition of Gold and Other Alloys by a New Method. G. E. Gardam and N. E. Tidswell. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 25, v. 31, 1954, 8 p. (TS670 E25j)

Deposit composition can be controlled by use of d.c. pulses and composition of the electrolyte. Tables, graph, diagrams.

3740 A Laboratory Technique for the Electrodeposition of Manganese on Other Metals. Winifred A. Bell. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 27, v. 31, 1954, 10 p. + 1 plate. (TS670 E25j)

Technique for bright smooth plates on Al and steel. Diagram, photograph. 11 ref.

3741 Unsolved Problems in the Metal Finishing Industry. W. L. Pinner. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 28, v. 31, 1954, 6 p. (TS670 E25j)

Need for reliable corrosion test, process for ductile bright Ni deposit, and a satisfactory cyanide-copper electrolyte.

3742 The Electrodeposition of Porous Metal. Charles L. Faust and William H. Safranek. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 31, 1954, 10 p. + 2 plates. (TS670 E25j)

Production of coherent porous deposits of Cu, Ni, and Zn by use of colloidal graphite as an addition agent. Photograph, micrographs, graphs, table. 2 ref.

3743 Electroplating With Modulated Current. P. Baeyens. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 32, v. 31, 1954, 24 p. (TS670 E25j)

Production and use of repeated changes in plating current in one electroplating operation. Diagrams, graphs. 110 ref.

3744* The Production and Properties of Copper-Coated Aluminium Plate. **Rézzel borított alumíniumlemez előállítása és tulajdonságai.** (Hungarian.) Ferenc Kőszegi. *Kohászati Lapok*, v. 9, no. 11, Nov. 1954, p. 520-523.

Review of problems. Application of Zn intermediate layer. Physical and mechanical properties. Diagrams, tables, micrographs.

3745 Electroplating of Magnesium. Leo D. Goddeyne and Dennis J. Goddeyne. *Light Metal Age*, v. 11, Dec. 1954, p. 30-31, 36.

Process for depositing a Cu, Ni, and Cr finish on a small, thin-walled part. Photograph.

3746 Brush Plating Now Practical. Marvin Rubinstein. *Materials & Methods*, v. 40, Dec. 1954, p. 98-101.

Improvements in French process permit high speed plating, high purity of deposits, and spot and selective plating. Photographs, table.

3747* Ion Exchange a Practical Tool in the Plating Room. R. J. Keating. *Metal Finishing*, v. 52, Dec. 1954, p. 52-55.

Applications include treatment of water, purifying plating baths, and recovery of metals from rinse waters and other wastes. Photographs, diagrams.

3748* High Speed Brass Plating. Theodore Z. Voyda. *Metal Finishing*, v. 52, Dec. 1954, p. 56-60.

Bath solutions, operating conditions, and factors which influence the deposition of heavy plates of satisfactory color and buffing characteristics. Tables. 8 ref.

3749 Electrodeposition of the Platinum Metals. E. H. Laister. *Metal Industry*, v. 85, Nov. 19, 1954, p. 427-429.

Processes and applications for the plating of Pt, Pd, and Rh. Process characteristics of commercially developed coatings. Photograph. (To be continued.)

3750 Electrodeposition of the Platinum Metals. E. H. Laister. *Metal Industry*, v. 85, Dec. 3, 1954, p. 469-470.

Properties and applications of Pt, Pd, and Rh platings. Photograph, table.

3751* The Sanford Process. John B. Franklin. *Metal Treating*, v. 5, Nov.-Dec. 1954, p. 2-3.

Electrochemical surface oxidation produces thick coatings which are wear and corrosion resistant. Photographs.

3752 Brass Plating. K. G. Compton, R. A. Ehrhardt, and G. Bittrich. *Plating*, v. 41, Dec. 1954, p. 1431-1439; disc., p. 1439.

Development of solutions for depositing 65 to 75% Cu alloy with a minimum of composition variation. Graphs, tables. 31 ref.

3753 The Throwing Power of Tin and Tin Alloy Plating Solutions. Frederick A. Lowenheim. *Plating*, v. 41, Dec. 1954, p. 1440-1445; disc., p. 1445.

Preliminary results on factors affecting throwing power and characteristics of the Sn-Ni and Sn-Zn processes. Graphs, diagrams, tables. 10 ref.

3754 Servo Control in the Electropolishing of Wire and Strip. A. Korbelak and C. M. Rively. *Plating*, v. 41, Dec. 1954, p. 1446-1449.

Principles of system for continuous production of W wire. Photograph, diagrams. 3 ref.

3755* Electrolytic Polishing of Steel Strips. **Elektrolityczne polerowanie stalowej taśmy.** (Polish.) Z. Wójcik. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 5, 1954, p. 257-263.

Method for carbon steel uses additional contacts and cathodes are placed perpendicular to the steel surface. Tables, graphs, diagrams, photograph. 5 ref.

3756 Methods of Plating Aluminum Die Castings. Lynn Sprague. *Precision Metal Molding*, v. 12, Dec. 1954, p. 63 + 4 pages.

Surface preparation, plating data, and kinds of plating for various applications. Photograph.

3757* Cures for Faults in Electroplating: Silver Plating Troubles. H. Prince. *Product Finishing*, v. 7, Oct. 1954, p. 69-71.

Reference tables to a variety of finishing problems and suggested corrective measures. Tables.

3758* Diffusion Chrome Plating of Steel in a Medium of Chromium Oxide. **Diffuzionnoe khromirovanie stali v srede okisi khroma.** (Russian.) G. N. Dubinin. *Vestnik Mashinostroeniia*, v. 34, no. 11, Nov. 1954, p. 56-58.

Experimental data on use of powdered oxides. Table, micrographs.

3759 Electrotinning of Copper Wire From the Stannous Fluoborate Bath. A. E. Carlson. *Wire and Wire Products*, v. 29, Dec. 1954, p. 1427-1428, 1488-1490.

Process, equipment, and bath compositions; advantages. Photograph, tables.

3760* The Theory of the Throwing Power of Complex Copper Electrolytes. **K teorii rasseivaiushchei sposobnosti kompleksnykh mednykh elektrolitov.** (Russian.) A. V. Izmailov and S. V. Gorbachev. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 9, Sept. 1954, p. 1529-1538.

Nature of the throwing power is determined by the mechanism of the cathode process and type of polarization. Two types of cathodic-deposition mechanisms are possible, followed by chemical or concentration polarization. Graphs. 16 ref.

3761* Theory of the Process of Anodic-Film Formation on Aluminium. **K teorii protsessa obrazovaniia anodnoi plenki na aliuminii.** (Russian.) I. V. Krotov. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 9, Sept. 1954, p. 1550-1554.

A new interpretation of the mechanism of anodic oxidation indicates process must be considered not only electrochemical, but also colloidal-electrochemical. Diagram. 11 ref.

3762* Problem of the Mechanism of Chromium Electrodeposition. **K voprosu o mekhanizme elektroosazhdeniia**

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khroma. (Russian.) A. I. Levin and A. I. Falicheva. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 9, Sept. 1954, p. 1652-1661.

A series of characteristic peculiarities of the process are explained on the basis of the theory of direct reduction of chromate atoms on the cathode. Photograph, graphs. 32 ref.

3763* Influence of Lithium Ions on the Process of Copper Electrodeposition. **Vliianie ionov litiia na protsess elektroosazhdeniia medi.** (Russian.) S. V. Gorbachev and R. M. Vasenin. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 10, Oct. 1954, p. 1795-1803.

Effective energy of activation. Effects of current density polarization, and concentration of Li_2SO_4. Graphs, table. 9 ref.

3764* Regularities of Electrolytic Polishing of Duralumin. **Zakonomernosti Elektroliticheskoi Polirovki Diuraliumina.** (Russian.) A. Sh. Valeev. *Zhurnal Prikladnoi Khimii*, v. 27, no. 8, Aug. 1954, p. 882-890.

Behavior during anodic polishing, in a mixture of H_3PO_4, H_2SO_4 and H_2CrO_4, and at different anode potentials, current densities, and temperatures. Graphs, tables, micrographs. 1 ref.

3765* Electrolytic Polishing of Copper at Low Current Density. **Elektroliticheskaia Polirovka Medi Pri Nizkoi Plotnosti Toka.** (Russian.) V. A. Dmitriev. *Zhurnal Prikladnoi Khimii*, v. 27, no. 8, Aug. 1954, p. 891-900.

Investigates anodic dissolution of cold-rolled and annealed Cu in H_3PO_4, with the anode in the horizontal position. Tables, diagram, X-ray diffractograms. 19 ref.

Books and Miscellaneous Publications

3766 Handbook of Industrial Electroplating. E. A. Ollard and E. B. Smith. 2nd Ed. 366 p. 1954. Iliffe & Sons, London. (TS670 OL4h2)

Reference book on all aspects of modern electrodeposition plant and plating technique, with emphasis on water and drainage, purification of solutions, safety precautions and ventilation in plating shops, and special problems of control and costing.

3767 Chromium Plating. Paul Morisset, J. W. Oswald, C. R. Draper, and R. Pinner. 611 p. 1954. Robert Draper, Teddington, England. (TS692.C4 M82c)

All aspects of production, properties, applications, and auxilliary treatments of chromium platings.

See also:
3365 (analysis of plating baths)
3394 (reductions at metal surfaces)
3469 (electrolyte-solvent interaction)
3603 (electrotinning)
3673 (plating equipment)
3917 (photosensitized anodized coatings on Al)
3968 (instruments for electrochemistry)
4208 (Ni electrodeposits)
4367 (electrodeposition of Ag-Pd and Cu-Pd alloys)

ELECTRONICS

3768* Elliptical Polarization of Electromagnetic Radiation. **La polarisation elliptique du rayonnement électromagnétique.** (French.) Maurice Bouix. *Annales des Télécommunications*, v. 9, no. 10, Oct. 1954, p. 275-281.

Various representations of elliptical polarization and application of Maxwell's equations. Diagrams. (To be continued.)

3769* The Theory of Diffusion and Drift Transistors. **Zur Theorie des Diffusions-und des Drifttransistors. III.** Problems of Dimensions. **Dimensionierungsfragen.** (German.) Herbert Krömer. *Archiv der elektrischen Übertragung*, v. 8, no. 11, Nov. 1954, p. 499-504.

Methods of improving the emitter capacitance and behavior with respect to current density. Graphs, diagrams. 10 ref.

3770* The Application of AlSb for Crystal Diodes. **Zur Anwendung von AlSb für Kristalloden.** (German.) Gotthold Zielasek. *Archiv der elektrischen Übertragung*, v. 8, no. 11, Nov. 1954, p. 529-533.

Rectifying characteristics of AlSb diodes provides a higher slope of the forward current than Ge, but the diffusion voltage is less than that of Ge and Si. Graphs, tables, diagrams. 13 ref.

3771* Inductive Behavior of *p-n-* Transistors in the Direction of Flow. **Induktives Verhalten von *p-n-* Übergängen in Flussrichtung.** (German.) Gerhard Kohn and Walter Nonnenmacher. *Archiv der elektrischen Übertragung*, v. 8, no. 12, Dec. 1954, p. 561-564.

Pulsed measurements on junction and point-contact diodes of Ge suggest an inductive equivalent circuit for the forward admittance. Graphs, circuit diagrams, diagrams. 3 ref.

3772 Feedback. The Basis of System Integration. J. M. Ham. *Canadian Chemical Processing*, v. 38, Dec. 1954, p. 75-77.

Basic concepts of feedback control. Diagrams. 4 ref.

3773* Determination of the "Electronic Temperature" in Discharge in Gases Excited at Ultrahigh-Frequency. **Détermination de la "température électronique" dans la décharge dans les gaz excités en ultra-haute fréquence.** (French.) Michel Bayet and François Guérineau. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1029-1031.

In a wide range of pressures and excitation intensities, the electronic temperature remains almost constant. Graphs, table. 4 ref.

3774* Influence of Surface Recombination on the Current Amplitude of the Junction Transistor. **Sur l'influence de la recombinaison en surface sur le gain en courant du transistor à jonction.** (French.) Jacques Laplume. *Comptes rendus*, v. 239, no. 20, Nov. 15, 1954, p. 1274-1276.

Theoretical study. Diagram. 2 ref.

3775* Harmonic Distortion by Wave Guides in Sinusoidal Frequency Modulation. **Distorsion harmonique des guides d'ondes, en modulation de fréquence sinusoïdale.** (French.) Louis Robin. *Comptes rendus*, v. 239, no. 20, Nov. 15, 1954, p. 1279-1280.

Formula for calculating distortion in cylindrical wave guides having perfect conductivity and of any size. 4 ref.

3776* Experimental Study of a Helical Wave Guide as a Linear Accelerator With Heavy Particles: Phase Speed. **Étude expérimentale d'un guide d'onde à hélice pour accélérateur linéaire à particules lourdes: vitesse de phase.** (French.) Albert Septier. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1367-1369.

Determination of characteristics. Graph, drawings. 4 ref.

3777* Process of Rapid Calculation of the Complex Dielectric Constant in Centimetric Waves (Method of Small Rods). **Procédé de calcul rapide de la constante diélectrique complexe en ondes centrimétrique. (Méthode des bâtonnets.)** (French.) Serge Le Montagner, Jean Le Bot, Simone Chauvin, and Raoul Haye. *Comptes rendus*, v. 239, no. 22, Nov. 29, 1954, p. 1474-1476.

Describes use of nomograms in calculation. Diagrams. 1 ref.

3778* **Glossary of Terms in the Field of Computers and Automation.** *Computers and Automation*, v. 3, Dec. 1954, p. 8-23.

3779* The Effect of Contact Recombination on the Volt-Ampere Characteristics of a Rectifier. **Vliianie rekombinatsii na kontakte na vol't-ampernuiu kharakteristiku vypriamitelia.** (Russian.) A. V. Rzhanov. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 389-390.

Mathematical treatment. 2 ref.

3780* Influence of Impurities on the Thermal Conductivity of Semiconductors. **Vliianie Primesei na teploprovodnost' poluprovodnikov.** (Russian.) A. V. Ioffe and A. F. Ioffe. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 757-759.

Theoretical investigation, limited to the components originating in the propagation of phonons. Graph, tables. 3 ref.

3781* Electromagnetic Waves in a Rectilinear Wave Guide Filled With Magnetized Ferrite. **Elektromagnitnye volny v priamougol'nom volnovode, zapolnennom namagnichen-**

nym ferritom. (Russian.) A. L. Mikaelian. *Doklady Akademii Nauk SSSR*, v. 98, no. 6, Oct. 21, 1954, p. 941-944.

Theoretical analysis of the propagation of waves with the ferrite magnetized perpendicular to the wave guide axis. Diagrams. 3 ref.

3782 Transistors as On-Off Switches in Saturable-Core Circuits. R. Louis Bright, G. Frank Pittman, Jr., and George H. Royer. *Electrical Manufacturing*, v. 54, Dec. 1954, p. 79-82.

Two novel circuits using junction transistors and saturable cores. Photographs, diagrams.

3783 Choosing Rectifiers for Magnetic-Amplifier Circuits. Norman F. Bechtold and Marcel B. Zucchino. *Electrical Manufacturing*, v. 54, Dec. 1954, p. 105-107, 294, 296.

Various types of rectifiers are evaluated on the basis of back voltage, temperature characteristics, and a.c. and d.c. loads. Graphs, circuit diagrams.

3784 Adapting Digital Techniques for Automatic Controls. II. Bernard M. Gordon. *Electrical Manufacturing*, v. 54, Dec. 1954, p. 120-125, 298, 300.

Four applications are described to illustrate the use of a hybrid computer system in industrial controls. Diagrams, graphs.

3785 Three-Phase High-Speed Magnetic Amplifiers. A. E. Maine. *Electronic Engineering*, v. 26, Dec. 1954, p. 514-521.

Results of an experimental study on extension of principles of "half-wave" amplifiers. Circuit diagrams, graphs, photograph. 8 ref.

3786 The Design of Triodes for U.H.F. Medium-Level Power Amplifiers. W. E. Rowlands. *Electronic Engineering*, v. 26, Dec. 1954, p. 522-527.

Design factors involved in amplifier tubes and grids; oxide-coated cathode; effects of the heat reflexion coefficients of electrodes; relation between evaporation from cathode and grid growth; tube life. Nomogram, diagrams. 15 ref.

3787 Tridac (A Three Dimensional Analogue Computor). *Electronic Engineering*, v. 26, Dec. 1954, p. 550-551.

Describes England's largest calculating machine and its use in conjunction with computing data for military problems. Photographs.

3788 Navy Transmitter Uses Frequency Synthesizer. Hugo Romander and Robert Watson. *Electronics*, v. 28, Jan. 1955, p. 138-143.

Broadband long-wave transmitter for point-to-point, teleprinter or facsimile communication can be set to any desired frequency from 30 to 600 kc. Accuracy is within 3 c.p.s. Photographs, circuit diagrams.

3789 New Relay Materials Improve Performance. Frank Rockett. *Electronics*, v. 28, Jan. 1955, p. 144-148.

Tungsten-carbide contacts, Ni-Fe armatures, stainless steel springs, silicone damping fluids, and self-shielded cores are examples of new materials that have improved relay reliability, sensitivity, life, and versatility for use in electronic equipment. Photographs, diagrams, graphs, circuit diagram.

3790 Phase Meter Analyzes Color TV Systems. Richard W. Houghton. *Electronics*, v. 28, Jan. 1955, p. 156-160.

Meter embodying frequency reduction in input channels and summation of resultant signals. Circuit diagrams, diagrams. 12 ref.

3791 Storage Tube Employs Secondary Emission. W. E. M. Uhlmann. *Electronics*, v. 28, Jan. 1955, p. 161-163.

Tube has 20 secondary-electron emitting elements between its anode elements for pulse-position modulation systems. Circuit diagrams, photograph, diagrams.

3792 Junction Transistor Switching Circuits. Thomas A. Prugh. *Electronics*, v. 28, Jan. 1955, p. 168-171.

Blocking oscillator, multivibrator, flip-flop, gating and adding circuits used in experimental 75-transistor switching system. Circuit diagrams, photographs, transient response curves. 6 ref.

3793 Nomographs for Rectangular Waveguides. T. S. Chen. *Electronics*, v. 28, Jan. 1955, p. 172-176, 178.

Parameters that determine propagation characteristics of dominant waves at a no. of operating frequencies. Nomographs.

3794* Principle of Duality in the Theory of Magnetic Amplifiers. **Printsip dvoistvennosti v teorii magnitnykh usilitelei.** (Russian.) V. F. Remnev. *Elektrichestvo*, 1954, no. 11, Nov., p. 76-80.

Investigates the use of saturation choke coil as current generator, and electronic tube as voltage generator. Comparisons between parameters of both types of amplifiers. Graphs, circuit diagrams. 5 ref.

3795* Operation and Use of Transistors. **Wirkung und Anwendung von Transistoren.** (German.) C. Moerder. *Elektrotechnik und Maschinenbau*, v. 71, nos. 15-16, Aug. 1, 1954, p. 389-394.

Design of different transistors, the mechanism of their operation, and some of their most important uses. Diagrams, graphs. 4 ref.

3796 The Traveling Wave Tube—A Record of Its Early History. Robert L. Wathen. *Franklin Institute, Journal*, v. 258, Dec. 1954, p. 429-442.

Traces published history of the traveling wave-electron beam interaction principle from its origin. Analytical and experimental results and future applications in radar, communications, and navigational systems. Diagrams. 29 ref.

3797* Microwave Interferometer. S. K. Chatterjee, C. Rama Bai, and P. R. Shenoy. *Indian Institute of Science, Journal*, v. 36, sec. B, Oct. 1954, p. 172-192 + 2 plates.

Design and operation of interferometer to study properties of artificial dielectrics at microwave frequencies. Diagrams, graphs, tables. 12 ref.

3798 Some Recent Advances in Microwave Tubes. J. R. Pierce. *I.R.E., Proceedings*, v. 42, Dec. 1954, p. 1735-1747.

Discusses high-power klystrons, double-tuned circuits, noise in traveling-wave tubes and its reduction by space-charge-wave deamplification, periodic magnetic focusing of electron beams, and the backward-wave oscillator. Photographs, oscillographs, graphs, diagrams. 45 ref.

3799 Large-Signal Behavior of Junction Transistors. J. J. Ebers and J. L. Moll. *I.R.E., Proceedings*, v. 42, Dec. 1954, p. 1761-1772.

Theory relating such behavior to the familiar small signal transistor parameters is applicable to all large-signal applications. Diagrams, circuit diagrams, graphs. 7 ref.

3800 The Approximation Problem of Network Synthesis. Stanley Winkler. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Circuit Theory*, v. CT-1, no. 3, Sept. 1954, p. 5-20. (TK1 In6.6c)

Mathematical analysis. 240 ref.

3801 A General Method for Time Domain Network Synthesis. Freddy Ba Hli. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Circuit Theory*, v. CT-1, no. 3, Sept. 1954, p. 21-28. (TK1 In6.6c)

Includes graphs, diagrams.

3802 Transient Snythesis in the Time Domain. William H. Kautz. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Circuit Theory*, v. CT-1, no. 3, Sept. 1954, p. 29-39. (TK1 In6.6c)

Mechanics of method based upon orthogonal expansions. Tables, graphs, diagrams.

3803 The Introduction of Constraints Into Feedback System Designs. John H. Westcott. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Circuit Theory*, v. CT-1, no. 3, Sept. 1954, p. 39-49. (TK1 In6.6c)

Mathematical analysis. Diagrams, graphs.

3804 Digital Techniques and Binary Numbers. Martin L. Klein. *Instruments and Automation*, v. 27, Dec. (pt. 1,) 1954, p. 1944-1947.

A clear, simple, and fundamental analysis of the meaning of numbers, the binary system, and "logical electronics." Diagrams, circuit diagram, table.

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3805 Functional Design Considerations for an Inexpensive Analog Computer. William Hecox, Robert E. Martin, and Bernard H. List. *Instrument Society of America, Proceedings*, v. 8, 1953, p. 234-237.

Design requirements for electronic differential analyzers presented from point of view of ease of setting up problems and maintenance, and versatility. Techniques used in construction of the Battelle Electronic Differential Analyzer. Photographs, diagrams. 2 ref.

3806* Measurement of Magnetic Permeability and Dielectric Constant in Some Ferrodielectrics With Centimeter Waves. **Izmerenie magnitnoi pronitsaemosti i dielektricheskoi postoiannoi v nekotorykh ferrodielektrikakh na santimetrovykh volnakh.** (Russian.) S. G. Salikhov. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia*, v. 18, no. 4, July-Aug. 1954, p. 456-464.

Investigation of ferromagnetic resonance in Ni-Zn ferrites and $FeO \cdot Fe_2O_3$ crystals. Tables, diagrams, graphs. 4 ref.

3807 Charge-Transfer-No-Bond Adsorption. F. A. Matsen, A. C. Makrides, and N. Hackerman. *Journal of Chemical Physics*, v. 22, Nov. 1954.

Applied to adsorption on metals and *p* type semiconductors. Heat of adsorption is divided into four functions. Graphs. 18 ref.

3808* Remark on the Stabilization of the Response of a Condenser Microphone. **Remarque sur la stabilisation de la réponse d'un microphone condensateur.** (French.) C. Colin. *Journal de physique et le radium*, v. 15, no. 12, Dec. 1954, p. 820-822.

Response by counter reaction is improved if a second electrode is added and the collected voltage is in phase with the displacement of the membrane. Diagram. 1 ref.

3809 Calculation of the Magnetic Field in the Ferromagnetic Layer of a Magnetic Drum. Olle Karlqvist. *Kungl. Tekniska Högskolans Handlingar (Transactions of the Royal Institute of Technology, Stockholm, Sweden)*, 1954, no. 86, 28 p. (T4 K96t)

Field variations with permeability, airgap, layer thickness, and other influencing factors. Solves the linear boundary value problem for the two-dimensional static field and the one-dimensional transient field. Diagrams, graphs. 16 ref.

3810* The Use of a Digital Computer With Particular Reference to the Analysis of Structures. R. K. Livesley and T. M. Charlton. *North East Coast Institution of Engineers & Shipbuilders, Transactions*, v. 71, Dec. 1954, p. 67-88 + 1 plate.

Describes basic principles, applications to engineering problems of economical frame design by methods of elastic and plastic theories and vibration analysis, future use. Tables, photographs, diagrams. 13 ref.

3811 Theory of the Thermoelectric Power of Semiconductors. Conyers Herring. *Physical Review*, v. 96, ser. 2, Dec. 1, 1954, p. 1163-1187.

Develops theory of the phonon effect quantitatively and obtains basic information on semiconductors from a comparison of the results with experiment. Graphs, tables, diagram. 56 ref.

3812 Long Period Effects in Germanium Crystal Rectifiers. (English.) Makoto Kikuchi. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 665-670.

Explanation of "creep" and "creep of photocurrent" by a model using trapping levels. Diagram, graphs. 6 ref.

3813 Hall Effect and Electrical Conductivity of Lead Selenide. (English.) Eiji Hirahara and Miyuki Murakami. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 671-681.

Data for P- and N-types from 500 to −180 C. Graphs, diagram. 10 ref.

3814* Physical Basis of the Action of Crystalline Triodes. **Fizicheskie osnovy deistviia kristallicheskikh triodov.** (Russian.) N. Penin. *Radio*, 1954, no. 10, Oct., p. 27-28.

Distribution in semiconductor triode with electron-hole passages. Frequency properties and amplification. Graphs, circuit diagram, diagram.

3815 Pole Mount Microwave Station. Paul A. Greenmeyer. *Radio-Electronic Engineering*, v. 24, Jan. 1955, p. 7-9, 36-37.

Inexpensive "packaged" microwave system for the 960-Mc. band provides voice and control circuits and can be integrated into other systems. Photographs, tables, graphs, diagram.

3816 The "Uni-Level" Amplifier. Archie A. McGee. *Radio-Electronic Engineering*, v. 24, Jan. 1955, p. 15-17.

Design details of a compact, plug-in amplifier for the automatic control of audio level variations. Photographs, circuit diagrams, graph. 1 ref.

3817 Diode Amplifier. A. W. Holt. *Radio-Electronic Engineering*, v. 24, Jan. 1955, p. 18-19, 32-33.

Reverse tarnsient phenomena of semiconductor diodes can be utilized to produce power gains up to ten per stage. Circuit diagrams, waveform diagrams.

3818 An Electron Current and Energy Regulator for Mass Spectrometer Ion Sources. Dwight A. Hutchison and Jay R. Wolff. *Review of Scientific Instruments*, v. 25, Nov. 1954, p. 1083-1088.

Presents description of regulator and effects on mass spectra due to increased stability. Circuit diagrams, diagram, table. 8 ref.

3819* Data Transmission Systems. **Transmisores de datos.** (Spanish.) Adolfo García-Abrines y Calvo. *Revista de ciencia aplicada*, v. 8, no. 39, July-Aug. 1954, p. 299-320.

Various types of alternating and d.c. units for transmitting and receiving. Tables, circuit diagrams, diagrams. 32 ref.

3820* The Transistor as an Industrial Research Episode. Ralph Bown. *Scientific Monthly*, v. 80, Jan. 1955, p. 40-46.

Describes how the transistor came about as a product of its time and environment, and its general status today. Photographs, diagrams. 3 ref.

3821 Ballast Circuit Design. R. C. Geldmacher. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 27-32; disc., p. 33-38.

Effects of various parameters on accuracy of a ballast circuit in strain gage bridges. Circuit diagrams, graphs, table.

3822 Recent Developments in Silicon Fusion Transistors. R. A. Gudmundsen, W. P. Waters, A. L. Wannlund, and W. V. Wright. *Tele-Tech & Electronic Industries*, v. 13, Dec. 1954, p. 76-78, 149-150.

Review of Si-Sn and Si-Au junction characteristics. Graphs, diagrams, photographs.

3823 High Precision Automatic Frequency Comparator and Recorder. John M. Shaull. *Tele-Tech & Electronic Industries*, v. 14, sec. 1, Jan. 1955, p. 58 + 8 pages.

Development of a new wide range beat frequency recorder, capable of detecting and recording graphically frequency deviations in the order of one part in 100 billion. Photographs, diagram, circuit diagram. 4 ref.

3824 Dyseac—The New NBS Electronic Computer. *U. S. Department of Commerce, National Bureau of Standards, Summary Technical Report* 1853, June 1954, 19 p. (T1 Un3.5s)

Describes a high-speed digital computer which, with flexibility of control and response to a variety of external devices, solves system-simulation problems, and evaluates certain novel logical design features and component packaging techniques. Tables. 6 ref.

3825 Transistor Circuit Components. *U. S. Department of Commerce, Office of Technical Services*, PB 114778, 19 p. (T21 Un3r)

Reviews available components which meet the needs of transistor circuitry and those now being developed to fill the gaps. Photographs.

3826* Contemporary State of the Theory of the Electrical Breakdown of Solid Dielectrics. **Sovremennoe sostoianie teorii elektricheskogo proboia tverdykh dielektrikov.** (Russian.)

V. A. Chuenkov. *Uspekhi Fizicheskikh Nauk*, v. 54, no. 2, Oct. 1954, p. 185-230.

Mathematical and analytical treatment of main theories. Tables, graphs, diagram. 66 ref.

3827* The Nature of Donors Inside Oxide Layers. Calculation of Their Energy of Dissociation. **La nature des donneurs à l'intérieur des couches d'oxydes. Calcul de leur énergie de dissociation.** (French.) J. Ortusi. *Vide*, v. 9, nos. 52-53, July-Sept. 1954, p. 100-105.

Includes diagrams, graphs, table. 8 ref.

3828* Abnormal Distribution of Velocity of Electrons Emitted by an Oxide Cathode Under Pulse Conditions. **Distribution anormale des vitesses des électrons émis par une cathode à oxydes en régime d'impulsions.** (French.) C. G. J. Jansen, R. Loosjes, and K. Compaan. *Vide*, v. 9, nos. 52-53, July-Sept. 1954, p. 129-134.

Spectrographic examination and analysis. Graph, spectrographs. 18 ref.

3829* Measuring the Transverse Resistance of Oxide Cathodes. **Mesures de résistances transversales de cathodes à oxydes.** (French.) A. Kestelyn-Loebenstein. *Vide*, v. 9, nos. 52-53, July-Sept. 1954, p. 148-154.

Includes graphs, photograph, table. 10 ref.

3830 A Machine System for Accepting, Storing, and Searching Engineering Data on Electronic Components. Roy A. Corby, Harold J. Behm, and Alvin T. Maierson. *WADC Technical Report* 54-151, *U. S. Department of Commerce, Office of Technical Services*, PB 111548, 1954, 158 p. (TL507 Un3.18w)

A summary report on use of machine punched cards. Photographs, diagrams, graphs, tables.

3831* **Design of Video Couplings.** Dharmajit Gupta Sarma. *Wireless Engineer*, v. 31, Dec. 1954, p. 327-334.

Transient response of simple coupling networks with three (or four) independent elements by use of complex zeros and poles. Graphs, circuit diagrams. 3 ref.

3832* Electron-Optical Lens-Shaped Screen Systems and Their Application to Electronic Image Storage. **Elektronenoptische Linsenraster-Systeme und ihre Anwendung für Elektronenbildspeicher.** (German.) Max Knoll. *Zeitschrift für angewandte Physik*, v. 6, no. 10, Oct. 1954, p. 442-449.

Details on electron-optical arrangement of a two-dimensional raster of many small identical electron lenses for enlarging electron images. Diagrams, photographs. 24 ref.

3833* Concentration of Electric Waves by Pilot Plates. **Bündelung elektrischer Wellen durch Leitscheiben.** (German.) Giswalt von Trentini. *Zeitschrift für angewandte Physik*, v. 6, no. 10, Oct. 1954, p. 462-470.

Experimental and mathematical report on improvement of reception of a simple antenna with the aid of a system of pilot plates, based on the principle of refraction and reflection. Diagrams, graphs, photograph. 9 ref.

3834* Electron Production in Avalanche Discharges in Gas-Vapor Mixtures. A Contribution to the Mechanism of the Anode Counter. **Elektronen-Nachieferung bei Lawinenentladungen in Gas Dampf-Gemischen. Ein Beitrag zum Mechanismus des Plattenzählers.** (German.) K. J. Schmidt. *Zeitschrift für Physik*, v. 139, no. 3, 1954, p. 266-275.

Oscillographic recording of the current impulses of the electron avalanches in the anode counter filled with a gas-vapor mixture. Diagrams, graphs. 9 ref.

3835* Question of Temperature Dependence of the Thermal Electromotive Force of Impurity Semiconductors. **K voprosu o temperaturnio zavisimosti termoeds primesnykh poluprovodnikov.** (Russian.) T. A. Kontrorova. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1687-1696.

Includes graphs, table. 17 ref.

3836* A Method for Determining the Parameters of a Semiconductor. **Ob odnom metode opredeleniia parametrov poluprovodnika.** (Russian.) F. G. Bass and I. M. Tsidil'kovskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1834-1836.

Mathematical treatment. Table. 1 ref.

3837* Problem of Correlating the Thermal Conductivity of Semiconductors With the Mobility of the Electrons. **K voprosu o korreliatsii teploprovodnosti poluprovodnikov s podvizhnost'iu elektronov.** (Russian.) A. V. Ioffe and A. F. Ioffe. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1910-1911.

Correction of Goldsmid's table. Table.

3838* Theory of the Photomagnetic Effect in Semiconductors in the Case of Large Magnetic Fields. **Teoriia fotomagnitnogo effekta v poluprovodnikakh pri bol'shikh magnitnykh poliakh.** (Russian.) A. I. Ansel'm. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 2064-2069.

Investigates the electric field excited in large magnetic fields. Analyzes ionic semiconductors at low temperatures, and at. semiconductors. 10 ref.

Books and Miscellaneous Publications

3839 Radar and Other Electronic Inventions. Frank Ross, Jr. 244 p. 1954. Lothrop, Lee and Shepard Co., New York. (TK7880 R73r)

An outline of the origin, development and operation of radar and the field of electronics together with applications by the government, business, and industry.

See also:
4225 (temperature coefficient of electronic cores)
4492 (data processing machines)

ENGINEERING ECONOMICS

3840 European Productivity: Ceramics. John D. Sullivan. *Ceramic Age*, v. 64, sec. 1, Dec. 1954, p. 15, 32-34.

Compares availability of raw materials, operations, and labor; labor costs; and trade under American and European economy. 4 ref.

3841 1954 Petroleum Industry. R. W. Thomas and P. M. Arnold. *Chemical and Engineering News*, v. 33, Jan. 3, 1955, p. 24-26.

Natural gas showed increased consumption. Diagram.

3842 Foreign Trade in 1954. L. N. Markwood. *Chemical and Engineering News*, v. 33, Jan. 3, 1955, p. 27-28.

Increasing exports taken to mean that overseas industrialization developes a greater market.

3843 Capital Expenditures in 1954. C. P. Neidig. *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 104-107.

Shows first decline since 1949; stock issue, not loans, raised capital. Graph, tables.

3844 Some Considerations of Cost in the Design of Pressure Vessels. Val Weiler. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 622-625.

Considered in view of material, fabrication, and detail costs. Tables.

3845 What Does a Casting Cost? Urban F. von Rosen. *Foundry*, v. 83, Jan. 1955, p. 84-86, 140, 142.

Accounting system for small businesses. Charts.

3846* Development and Utilization of the Deposits of the Ruhr Region. **Über Aufschluss und Ausnutzung der Vorrätes des Ruhrgebiets.** (German.) Günter Fettweis. *Glückauf*, v. 90, nos. 45-46, Nov. 6, 1954, p. 1441-1451.

Historical and economic account of the coal-mining industry in the Ruhr region. Maps, tables, graphs. 25 ref.

3847 Energy Sources of the Future. C. C. Furnas. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2446-2457.

Reviews the international problem of energy conservation in face of a prodigious population increase. Fossil, nuclear, and solar sources evaluated. Map, diagram, photographs, tables, graphs. 3 ref.

Engineering Economics

3848 Plant Adaptation. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2463-2491.

A series of seven papers covering existing plant modification rather than new plant design. Visual aids. 21 ref.

3849 Costs. Process and Construction. J. C. Lawrence. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 65A-66A.

Depreciation allowances of new tax laws directly affect mill cost-profit relationship. Tables.

3850* Activity of French Iron Mines. **L'activité des mines de fer en France.** (French.) *Métallurgie et la construction mécanique*, v. 86, no. 10, Oct. 1954, p. 783, 787, 789.

Resumé of economic, financial, and technical aspects of above for 1953. Table.

3851 World-Wide Oil Report. Dahl M. Duff. *Oil and Gas Journal*, v. 53, Dec. 27, p. 117-179.

A special report on all phases of the industry in all parts of the World. Tables, maps.

3852 The National Survey of Consumer Painting Habits. Robert O. Fernald. *Paint, Oil & Chemical Review*, v. 117, Dec. 2, 1954, p. 27-31.

Findings from an extensive national consumer survey.

3853 Gulf Coast Petrochemicals at Peak? Henry Groppe. *Petroleum Processing*, v. 9, Dec. 1954, p. 1891-1893.

An evaluation; pros and cons. Map, table. 5 ref.

2854 What Metalworking Management Expects in 1955. *Steel*, v. 136, Jan. 3, 1955, p. 103-110.

Survey based on questionaire returns by 7500 plant managers.

3855* An Evaluation of Five Ways to Buy Machinery. Sydney D. Maddock. *Tooling and Production*, v. 20, Dec. 1954, p. 103-104.

A loan company president shows the fallacy of skimping with outdated equipment.

Books and Miscellaneous Publications

3856 The Future for Aromatic Chemicals. Wm. Wallace Abbott, Thomas A. Christiansen, Gordon Gardiner, John G. Lee, G. Howard Martin, Stanley Miller, and Raymond J. Schaaf. 131 p. 1954. William Wallace Abbott, Cambridge, Mass. (TP247 Ab29f)

Results of a business survey assigned as a project to students of the Harvard Graduate School of Business Administration. Contains ten chapters on various phases of the market.

3857 Russia's Soviet Economy. Harry Schwartz. 2nd Ed. 682 p. 1954. Prentice-Hall, New York. (HC335 Sch95r2)

Background aspects and the synthesis of available knowledge regarding all major sectors of the Soviet economy, especially organization and operation, with emphasis on developments in past 5 yr.

3858 The Nation Looks at Its Resources. Mid-Century Conference on Resources for the Future. 418 p. 1954. Resources for the Future, Washington, D. C. HC102 M58n)

Competing demands for use of land; utilization and development of land resources; water and energy resource problems; domestic problems of non-fuel minerals; U. S. concern with world resources; problems in resources research; patterns of cooperation.

See also:
3210 (marketing of pesticides)
3212 (status of fertilizer industry)
3213 (pesticide markets)
4027 (Australian Cu industry)
4482 (shortages of manpower and raw materials)
4517 (economics of coal washing)
4634 (synthetic rubber industry status)
4656 (status of textile industry)
4689 (design control and costs)
4702 (paper market)

FLUID MECHANICS

3859 Shock Waves in Gases. W. C. Griffith and Walker Bleakney. *American Journal of Physics*, v. 22, Dec. 1954, p. 597-612.

Properties and effects of shock waves and their relation to sound waves. Graphs, fringe patterns, shadowgraph, interferograms, tables. 43 ref.

3860 How to Make Use of Recent Mixing Developments. J. H. Rushton. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 587-589.

A discussion of several studies. Photograph, graphs. 10 ref.

3861 The Time of a Transfer Unit and an Agitation Number for Batch Operations Involving Mass Transfer. A. W. Hixson, T. B. Drew, and K. L. Knox. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 592-596.

Above derived for steady-state and agitated batch operations. Graphs, tables. 9 ref.

3862 Discharge Flow From Turbine-Type Mixing Impellers. J. P. Sachs and J. H. Rushton. *Chemical Engineering Progress*, v. 50, Dec. 1954, p. 597-603.

Characteristics determined by timed photography of tracer droplets in a plane of light. Diagrams, photographs, table, graphs. 5 ref.

3863* Analog Computers and Their Application to Heat Transfer and Fliud Flow. II. John E. Nolan. *Computers and Automation*, v. 3, Dec. 1954, p. 24, 27-34, 42.

Mathematical examples. Diagrams. (To be continued.)

3864* Stabilty and Transverse Flow of Two-Parameter Vortex Paths. **Ob ustoichivosti i kosom protekanii dvukhparametrovykh vikhrevykh dorozhek.** (Russian.) Bl. Dolapchiev. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 349-352.

Mathematical treatment. 9 ref.

3865* Approximate Integration of the Equation of Plane Vortex Supersonic Gas Flow. **Priblizhenoe integrirovanie uravneniia ploskogo vikhrevogo sverkhzvukovogo dvizheniia gaza.** (Russian.) I. Z. Kalishevich. *Doklady Akademii Nauk SSSR*, v. 99, no. 1, Nov. 1, 1954, p. 37-40.

Mathematical treatment. 3 ref.

3866 An Analytical Estimation of the Effect of Transpiration Cooling on the Heat-Transfer and Skin-Friction Characteristics of a Compressible, Turbulent Boundary Layer. Morris W. Rubesin. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3341, Dec. 1954, 56 p. (TL570 Un3t)

Analysis based on mixing-length theory. Graphs. 16 ref.

3867 An Experimental Study of Shock-Wave Refraction. C. A. Ford and I. I. Glass. *University of Toronto, Institute of Aerophysics, UTIA Report no.* 29, Sept. 1954, 66 p. (TL570 T64.84a)

Studies of refraction at a gaseous interface. Graphs, diagrams, photographs.

3868* Investigation of Heat Exchange When a Liquid Boils in Pipes. **Issledovanie teploobmena pri kipenii zhidkosti v trubakh.** (Russian.) L. S. Sterman. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 2046-2053.

Influence of physical properties of the heat-transfer medium on the intensity of heat exchange for pressures up to seven atmospheres. Graphs. 8 ref.

See also:
4007 (elements of fluid mechanics)
4579 (fluid motion)

FOOD TECHNOLOGY

3869 Pilot-Plant Production, Tempering, and Evaluation of Global Edible Spreads From Vegetable Oils. E. B. Lancaster, R. E. Beal, E. P. Jones, H. J. Dutton, C. D. Evans, and

J. C. Cowan. *American Oil Chemists' Society, Journal*, v. 32, Jan. 1955, p. 9-13.

Reports organoleptic testing of an edible spread developed for the Armed Forces. Diagram, tables, graphs. 5 ref.

3870 Some Physical Characteristics of Rearranged Lard. C. W. Hoerr and D. F. Waugh. *American Oil Chemists' Society, Journal*, v. 32, Jan. 1955, p. 37-41.

Ordinary lard, treated with sodium methoxide, forms only small crystals as do choice, hydrogenated vegetable shortenings. Micrographs, table, X-ray diffractogram, diagrams. 7 ref.

3871 Foods and Nutrition in 1954. Charles Glen King. *Chemical and Engineering News*, v. 33, Jan. 3, 1955, p. 29-31.

National diet is better but there is still room for improvement. Photograph.

3872* Radiation Sterilization of Foods. *Journal of Agricultural and Food Chemistry*, v. 2, Dec. 8, 1954, p. 1260-1266.

Side effects and chemical reactions resulting in off-flavor and off-odor are principal obstacles to commercial applications. Photographs, diagrams.

Books and Miscellaneous Publications

3873 Vitamins and Hormones. Advances in Research and Applications. Robert S. Harris, G. F. Marrian, and Kenneth V. Thimann, editors. v. XII. 305 p. 1954. Academic Press, New York. (QP801.V5 V83)

Eight papers on the chemistry of vitamin B_{12}; intestinal synthesis of vitamins in the ruminants; hypervitaminosis A; vitamin A requirements; nutrition and liver disease in man; light regulation of hormone secretion; estrogens in plants and their effects on domestic fowl.

3874 The Vitamins. Chemistry, Physiology, Pathology. W. H. Sebrell, Jr. and Robert S. Harris, editors. v. III. 665p. 1954. Academic Press, New York. (QP801.V5 V83.1)

Studies of *p*-amino benzoic acid, petroylglutamic acid, vitamin B_6 group, riboflavin, thiamine, the tocopherols, and new and unidentified growth factors.

See also:
3245 (role of vitamins)
3255 (industrial fermentation)
3256 (chemical structure of proteins)
3307 (processing of sugar)

FUELS AND COMBUSTION

3875* The Thioreactivity of Fuels. **Sur la thioréactivité des combustibles. V.** Expression of the Rate of Formation of Carbon Disulfide as a Function of the Pressure of Sulfur and the Temperature, and Mechanism of the Reaction. **Expression de la vitesse de formation du sulfure de carbone, en fonction de la pression de soufre et de la température, et mécanisme de la réaction.** (French.) Jean Adam-Gironne. *Bulletin de la société chimique de France*, 1954, no. 10, Oct., p. 1234-1237.

Includes graphs, table. 6 ref.

3876* Contribution to the Study of the Oxidation of Coals at Low Temperatures. **Contribution à l'étude de l'oxydation des charbons à basses températures.** (French.) Marthe Bastick. *Bulletin de la société chimique de France*, 1954, no. 10, Oct., p. 1239-1246.

Oxidation in an oven at 100 C and in a sealed apparatus. Oxidized specimens studied to see how O attacks the coal. Tables, graphs, diagram. 20 ref.

3877 Flame Stabilization in a Hot Gas Stream by the Upstream Air Blast Injection of Kerosene Fuel. N. Golitzine. *Canada, National Aeronautical Establishment Report* LR-102, 1954, 14 p. (TL501 C16.5L)

Flame stability limits were narrowed by gas velocity increase and gas pressure decrease, not greatly affected by temperature, and widened by increase in air blast pressure and flow. Graphs, diagrams, photograph.

3878* Submerged Combustion Equipment. Walter George See. *Chemical Engineering Costs Quarterly*, v. 4, Oct. 1954, p. 118-122.

Includes diagram, table.

3879 Combustion Rate of Coal Shale. L. J. Hellinckx. *Chemical Engineering Science*, v. 3, Nov. 1954, p. 201-208 + 1 plate.

Problem of O_2 reaching combustible C through mineral residues. Tables. 11 ref.

3880 Standard Pulverizing Equipment Gives Good Performance With Lignite. Alexander Bogot and George E. Gandsey. *Combustion*, v. 26, Dec. 1954, p. 38-43.

Reports on encouraging results of handling, preparing, and firing of lower cost fuels. Tables, graphs, diagram, photograph.

3881 Investigations With a Small Pressure Gasifier. I. The Study of the Reactions Occurring in the Fuel Bed. D. Hebden, R. F. Edge, and K. W. Foley. *Gas Council, Research Communication* GC14, Nov. 1954, 32 p. (TP700 G21.2r)

Pilot plant shows best conditions for normal town gas production. Photograph, diagrams, tables, graphs. 5 ref.

3882 A Cooling and Condensing System on a Large Carburetted Water Gas Plant. L. Silver. *Gas Council, Research Communication* GC15, Nov. 1954, 18 p. (TP700 G21.2r)

Describes a three-stage process. Photographs, tables, diagrams.

3883 Coal Travel in Continuous Vertical Retorts. C. H. Lewis. *Gas Council, Research Communication* GC19, Nov. 1954, 25 p. (TP700 G21.2r)

Reports seven studies at four installations with radioactive tallies. Tables, graphs, diagrams. 8 ref.

3884 Primary Air Entrainment in Gas Burners. W. A. Simmonds. *Gas Council, Research Communication* GC20, Nov. 1954, 52 p. (TP700 G21.2r)

Experimental results agree well with theory. Graphs, diagrams. 12 ref.

3885* Universal Burner for Different Gases. **Universalbrenner für verschiedene Gase.** (German.) Liemar Ehrhardt. *Gas- und Wasserfach*, v. 95, Ausgabe Gas, no. 19, Oct. 1, 1954, p. 612-615 + 1 plate.

Burner for propane and butane gases with nozzle adaptable for other gases. Diagrams, photograph.

3886* Fuel Oil and Its Comparison With Coke for Space Heating. **Heizöl und sein Vergleich mit Koks für die Raumheizung.** (German.) Friedrich Schulte. *Gas- und Wasserfach*, v. 95, Ausgabe Gas, no. 21, Nov. 1, 1954, p. 685-693.

Discussion of test results and measures of improving the efficiency of coke as a fuel. Diagrams, tables, charts, graphs.

3887 Kinetics of Coal Gasification. Howard R. Batchelder and Robert M. Busche. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2501-2508.

Data for design of atmospheric pressure gasifiers arranged as graphs based on theoretical considerations. Tables, graphs. 1 ref.

3888 Natural Gas-Air Explosions at Reduced Pressure. Melvin Gerstein, Edward R. Carlson, and Francis U. Hill. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2558-2562.

Detonations occurred in mixtures of natural gas and air down to 0.2 atmosphere. Hazard reduced by water spray and by rapid expansion. Photographs, diagrams, tables, graphs. 5 ref.

3889* Highways and By-Ways in Combustion. D. T. A. Townend. *Institute of Fuel, Journal*, v. 27, Nov. 1954, p. 534-544, 571 + 3 plates.

Gaseous explosions at high pressures; the combustion of higher hydrocarbons and engine knock; flame-stability. Graphs, diagrams, tables. 37 ref.

3890* Peat-Fired Power Stations. W. Cronin and J. F. Lang. *Institute of Fuel, Journal*, v. 27, Nov. 1954, p. 545-555 + 1 plate.

Combustion technique employed in using sod peat in Ireland;

Fuels and Combustion

proposals for use of milled peat in pulverized-fuel-fired boilers. Diagrams, tables.

3891* Metallic Recuperators and Industrial Furnace Recuperation. L. S. Brown. *Institute of Fuel, Journal,* v. 27, Nov. 1954, p. 556-559.

Performance curves of modern recuperators used with furnaces burning solid, liquid, or gaseous fuels, and their economy. Graphs.

3892 Structure of a Steady-State Plane Detonation Wave With Finite Reaction Rate. John G. Kirkwood and William W. Wood. *Journal of Chemical Physics,* v. 22, Nov. 1954, p. 1915-1919.

Von Neumann's detonation model is used. The Chapman-Jouguet condition is considered but error may enter in its application. 14 ref.

3893 The Reaction Zone in Gaseous Detonations. G. B. Kistiakowsky and Paul H. Kydd. *Journal of Chemical Physics,* v. 22, Nov. 1954, p. 1940-1941.

Study of 70% H_2, 30% O_2 plus Xe (for X-ray absorption) supports Zeldovich-van Neumann theory. Graph. 5 ref.

3894 The Fuel Cell. L. Stockman. *Machinery Lloyd (Overseas Ed.),* v. 26, Dec. 4, 1954, p. 93-98.

Describes the C-O and H-O cells in combustion processes. Diagrams.

3895* Sapozhnikov's Plastometric Method for the Evaluation of the Quality of Bituminous Coal. **Szapozsnyikov plasztometrikus vizgálati módszere feketekőszenek minősítésére.** (Hungarian.) Margit Weltner. *Magyar Kémikusok Lapja,* v. 9, no. 9, Sept. 1954, p. 282-284.

Determines thickness of the plastic layer and the plastometric shrinkage, for the purpose of determining coking properties. Diagrams, graphs.

3896* Coal Giving Trouble? Check Its Size Consist. C. W. Stevens. *Power,* v. 99, Jan. 1955, p. 100-101.

The influence of size distribution in fuel on performance. Graphs.

3897* Flames. Herbert P. Broida and Harold J. Morowitz. *Scientific Monthly,* v. 80, Jan. 1955, p. 3-9.

Detailed chemical and physical processes that determine nature and uses of a given flame. Photographs, spectrographs. 3 ref.

3898 Report of Research and Technologic Work on Coal and Related Investigations July 1, 1952, to December 31, 1953. R. L. Brown and E. P. Carman. *U. S. Bureau of Mines, Information Circular* 7699, Nov. 1954, 102 p. (TN21 Un3i)

Investigates increased conservation and more efficient use of fuel resources, safer mining methods, and improved preparation and utilization methods. Photographs, graphs, diagrams, maps. 83 ref.

3899 Prediction of Flame Velocities of Hydrocarbon Flames. Gordon L. Dugger and Dorothy M. Simon. *U. S. National Advisory Committee for Aeronautics, Report* 1158, 1954, 10 p. (TL521 Un3r)

Semitheoretical methods of prediction based on the Semenov, Tanford-Pease, and Manson equations. Graphs, tables. 30 ref.

3900 Burning Times of Magnesium Ribbons in Various Atmospheres. Kenneth P. Coffin. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3332, Dec. 1954, 37 p. (TL570 Un3t)

Investigates the gross physical mechanism of the combustion of Mg to determine whether a vapor-phase or surface reaction is involved; effect of the composition of the oxidizing atmosphere. Graphs, photographs, diagrams. 31 ref.

See also:
3321 (utilization of CH_4)
3357 (analysis of coals)
3498 (diffusion during combustion)
3570 (oxidation of benzene)
3841 (consumption of petroleum products)
3906 (peat as a fuel)
3930 (radiant heat transfer from flames)
3931 (burning rate studies)
4067 (combustion in steel furnaces)
4506 (removal of sulfur from coke)

GEOLOGY AND MINERALOGY

3901* Vanadium, Nickel, and Iron Trace Metals in Crude Oils of Western Canada. G. W. Hodgson. *American Association of Petroleum Geologists, Bulletin,* v. 38, Dec. 1954, p. 2537-2554.

Concentrations varied inversely with the A.P.I. gravity of the oils and ran from 0.04 to about 600 p.p.m. Significance of trace metals as a key to the migration of oils. Tables, diagrams, graph, map. 21 ref.

3902 Studies in the Mica Group; Single Crystal Data on Phlogopites, Biotites and Manganophyllites. A. A. Levinson and E. Wm. Heinrich. *American Mineralogist,* v. 39, Nov.-Dec. 1954, p. 937-945.

Investigation of the biotite-phlogopite series to understand causes of the complex polymorphism known to exist in these micas. Tables. 28 ref.

3903* X-Ray Investigation Into Identification of Crystalline Phases in Iron Ores. **Rentgenograficzna metoda identyfikacji faz krystalicznych w rudach żelaza.** (Polish.) Z. Bojarski and J. Kacprzak. *Prace Instytutów Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 264-274.

Lower limits of recognizability of several commercial ores. Refractograms, tables. 10 ref.

3904* Indian Manganese-Ore Deposits. **Indische Manganerzlagerstätten.** (German.) Nico Dekowski. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 11, Nov. 1954, p. 488-494.

Geology, petrography, and mineralogy; methods of mining and processing the ore; production costs; ore export between 1927-1951. Map, photographs, tables.

Books and Miscellaneous Publications

3905 Shore Scleroscope Hardness Tests Made on Mohs' Scale Minerals From Talc to Quartz, Inclusive. Bruce W. Gilbert. 23 p. 1954. Department of Mining and Metallurgical Engineering, University of Illinois, Urbana. (QE364 G37s)

Correlates the two hardness scales and derives a formula showing the existence of a linear relationship; compares Mohs' scale of hardness with the ratios of the energies expended to the volumes of deformation for the various mineral specimens.

3906 Soviet Peat Resources. George Kazakov. 201 p. 1953. Research Program on the U.S.S.R., New York. (TN840.R9 K18s)

Surveys the phenomena of marshes and swamps and their origin; formation and distribution of peat bogs; analyses of peats; methods of working peat deposits; utilization as a fuel and source of power; industrial uses; exploitation in agriculture; political aspects.

GEOPHYSICS

3907* Some Patterns of Formation of the Chemical Composition of Atmospheric Precipitates. **O nekotorykh zakonomernostiakh formirovaniia khimicheskogo sostava atmosphernykh osadkov.** (Russian.) P. P. Voronkov. *Doklady Akademii Nauk SSSR,* v. 98, no. 5, Oct. 11, 1954, p. 765-768.

Investigates the SO_4^{-2}, Cl^-, and Na^+ and aerosol content of precipitates in various regions. Table. 12 ref.

3908* Scientific Investigations in the Antarctic. **Nauchnye issledovaniia v Antarktike.** (Russian.) V. A. Zemskii. *Nauka i Zhizn,* v. 21, no. 11, Nov. 1954, p. 33-35 + 1 plate.

Whale plankton, and other antarctic marine life studied from special research ship and whalers. Photographs.

Books and Miscellaneous Publications

3909 Science in Progress. George A. Baitsell, editor. 8th ser. 285 p. 1953. Yale University Press, New Haven. (Q171 S27sc)

Ten papers covering the fields of the origin and evolution of the universe, atmospheres of the sun and earth, evolution of insects, origin of man, sensory physiology of animals, primitive and luminescent organisms, microwave spectroscopy, and molecular interactions in protein solutions.

3910 Rocket Exploration of the Upper Atmosphere. R. L. F. Boyd and M. J. Seaton, editors. Special Supplement v. I to the Journal of Atmospheric and Terrestrial Physics. 376 p. 1954. Interscience Publishers, New York. (QC806 R59)

Use of rocket techniques; pressures, temperatures, and winds in the high atmosphere; composition; structure of the ionosphere; solar ultra-violet radiations; geo-magnetic variations; cosmic ray measurements; theoretical interpretation of results.

3911* Tables for Rocket and Comet Orbits. Samuel Herrick. National Bureau of Standards, Applied Mathematics Series #20. 100 p. 1953. U. S. Government Printing Office, Washington, D. C. (QA55 Un3.5a)

Direct interpolation for determining position and velocity from the time, for rectilinear orbits and for "nearly parabalic" motion.

3912 The Ocean Floor. Hans Pettersson. 181 p. 1954. Yale University Press, New Haven. (GC83 P45o)

A popular review of contemporary oceanography based on the 33rd series of Silliman Lectures.

3913 Of Whales and Men. R. B. Robertson. 300 p. 1954. Alfred A. Knopf, New York. (SH381 R54o)

An exciting first-hand account of a modern Antarctic whaling expedition and the unusual men who follow one of the world's most unusual occupations.

See also:
4458 (climatic effects of thermo-nuclear explosions)

GRAPHIC ARTS

3914* Investigation of the Chemical Sensitization of a Photographic Emulsion. Action of the Reducing Agent. **Issledovanie khimicheskoi sensibilizatsii fotograficheskoi emul'sii. Deistvie vosstanovitelia.** (Russian.) E. A. Kirillov, Zh. L. Broun, and K. V. Chibisov. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 427-430.

Absorption spectra for films of Lippman emulsion. Hydrazine solutions. Heating periods. Graphs. 3 ref.

3915* Photography in Armament Development. E. W. Greenwood. *Engineering Journal*, v. 37, Dec. 1954, p. 1593-1603.

Outline of instruments and techniques for direct observation of weapon phenomena and, in particular, methods and equipment for high-speed photography. Photographs, shadowgraph, Schlieren photograph. 2 ref.

3916 High Speed Photography Detects Machinery Problems. Ross Weaver. *Iron Age*, v. 174, Dec. 30, 1954, p. 56-58.

Trouble shooting on process and assembly machines. Photographs.

3917* Photographs in Aluminum. *Modern Metals*, v. 10, Dec. 1954, p. 55-57.

New Metalphoto process produces almost any image or pattern on anodized plates. Diagrams.

3918* Thin Sections Through Grains of Photographic Emulsions. **Dünnschnitte durch Körner photographischer Emulsionen.** (German.) H. Frieser, I. Johann, and E. Klein. *Naturwissenschaften*, v. 41, no. 20, Oct. 1954, p. 475-476.

Study of grain structure and reactions to exposure and development. Micrographs. 1 ref.

3919 Interference Filters for Photographic Densitometry. E. K. Letzer and S. A. Powers. *Optical Society of America, Journal*, v. 44, Nov. 1954, p. 870-874.

Description and application. Graphs. 7 ref.

3920* Stereo Photomicrography With Cameras of Fixed Interocular Distance. Henry M. Lester and Oscar W. Richards. *Photographic Engineering*, v. 5, no. 3, 1954, p. 149-160.

Describes equipment and methods, lighting principles, and exposure information for securing results of good quality with either the bi-objective or monoobjective binocular microscope. Photographs, diagrams, graphs, circuit diagram. 9 ref.

3921* The Photographic Response of Several High-Speed Emulsions at Very Short Exposure Times. John Castle. *Photographic Engineering*, v. 5, no. 3, 1954, p. 189-194.

Sensitometric studies on three emulsions for exposure times of 1 μ sec. to 10 sec. and methods for increasing the speed of these materials at short exposure times. Graphs. 1 ref.

3922* The Sensitometry of Continuous Tone Xerography. W. E. Bixby, P. G. Andrus, and L. E. Walkup. *Photographic Engineering*, v. 5, no. 3, 1954, p. 195-201.

An analysis of the sensitometric characteristics of the process, and the advances made in tone reproduction. Photographs, graphs, diagrams.

3923* Intensity Measurements From Recording With the Guinier Camera (With a Discussion of the Lorentz Factor). **Intensitätsmessungen aus Aufnahmen in der Guinier-Kamera (mit einer Diskussion des Lorentz-Faktors).** (German.) Erwin Hellner. *Zeitschrift für Kristallographie*, v. 106, no. 2, Oct. 1954, p. 122-145.

Includes mathematics on the intensity-correction factors and the slope factor, application of correction factors, and the problem of photometering. Diagrams, photographs, graphs, table. 14 ref.

3924* Influence of the Properties of Gelatin on the Susceptibility of Photographic Emulsions to Optical Sensitization. **Vliianie svoistv zhelatiny na vospriimchivost' fotograficheskikh emul'sii k opticheskoi sensibilizatsii.** (Russian.) A. L. Karpova and Iu. Sh. Moshkovskii. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 10, Oct. 1954, p. 1745-1747.

Analysis of photographically active microcomponents of different gelatins; reducing component of Ag ions. Table, graph. 3 ref.

See also:
4562 (infra-red photography)

HEAT POWER

3925* Heat Transfer in the Engine With and Without Knock. **Wärmeübergang im Motor bei klopfender und nichtklopfender Verbrennung.** (German.) N. Erbakan. *Allgemeine Wärmetechnik; Zeitschrift für Wärme- und Kältetechnik*, v. 5, no. 8, 1954, p. 161-166.

Effect of knock variations on heat-transfer numbers; comparison of theoretical with experimental results; effect of amplitude and steepness of pressure wave in combustion chamber on heat-transfer number. Diagrams, graphs, table. 15 ref.

3926* Forms of Engine Combustion. **Erscheinungs-formen motorischer Verbrennung. I.** (German.) U. Neubert. *Allgemeine Wärmetechnik; Zeitschrift für Wärme- und Kältetechnik*, v. 5, no. 8, 1954, p. 166-171.

Photographic study of internal combustion patterns. Diagrams, photographs, graph. 7 ref.

3927 Gas Turbines for Process Use. I. Benjamin Miller. *Chemical Engineering*, v. 62, Jan. 1955, p. 175-180.

Three processes are compared. Diagrams, photograph. (To be continued.)

3928* Formation of Deposits in Gasoline Engines. **Rückstandsbildung in Ottomotoren.** (German.) Friedrich Kneule. *Erdöl und Kohle*, v. 7, no. 11, Nov. 1954, p. 720-724.

The mechanism of deposit formation; effect of deposits on the engine; effect of engine design, fuel, and lubricating oil on deposit formation; preventive measures. Photographs, graphs, diagram. 11 ref.

3929 Flow Apparatus for Determination of Spontaneous Ignition Delays. Joseph L. Jackson, Richard S. Brokaw, Robert C. Weast, and Melvin Gerstein. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2547-2550.

Effects of concentrations in a propane-air mixture. Diagrams, graphs. 9 ref.

Heat Power

3930 Radiant Heat Transfer From Flames in a Turbojet Combustor. Leonard Topper. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2551-2558.

Estimates emissivity of luminous hydrocarbon flames. Diagrams, graphs, tables. 7 ref.

3931 Burning Rate Studies. I. Measurement of the Temperature Distribution in Burning Liquid Strands. D. L. Hildenbrand, A. G. Whittaker, and C. B. Euston. *Journal of Physical Chemistry,* v. 58, Dec. 1954, p. 1130-1133.

Temperature is correlated with a camera record for several systems. Graphs. 3 ref.

3932 Internal Combustion Engines. I. Keith A. Carlson. *Machine Design,* v. 26, Dec. 1954, p. 156-170.

Selection and application factors for gasoline engines. Photographs, graphs, diagrams.

3933* The Compression-Injection Engine. *Oil Engine and Gas Turbine,* v. 22, Nov. 1954, p. 264-266.

New design offers lower manufacturing costs and maintenance simplicity. Photographs, diagram, graph.

3934 Effects of Fuel Type on the Performance of Aero Gas Turbine Combustion Chambers, and the Influence of Design Features. J. G. Sharp. *Royal Aeronautical Society, Journal,* v. 58, Dec. 1954, p. 813-825.

Performance based on combustion efficiency and stability, ease of ignition, deposits, exhaust temperature variation, and smooth combustion. Graphs, diagrams, photographs, table.

3935* Contribution to the Calculation of the Stresses Induced by Centrifugal Force in Rotating Blades of Axial Turbomachines. **Contributo al calcolo delle sollecitazioni indotte dalla forza centrifuga nelle pale giranti delle turbo macchine assiali.** (Italian.) Ezio Iurzolla and Danilo Fornasiero. *Tecnica italiana,* v. 9, no. 7, Oct.-Nov. 1954, p. 525-530.

Expressions for calulating tensile stresses and nomograms for graphic solution. Nomograms, diagrams. 6 ref.

See also:
3481 (heats of combustion of azides)
3868 (heat exchange in boilers)
3888 (detonations in gas-air mixtures)
3889 (knock in engines)
3997 (vibration in diesel engines)
4044 (materials for aircraft gas turbines)
4343 (fabrication of jet engine parts)

INFORMATION—PREPARATION AND DISSEMINATION

3936 Machine Age Overtakes Patents. *Chemical and Engineering News,* v. 33, Jan. 10, 1955, p. 150.

Bush Committee's recommendations on Patent Office practices.

3937* Paint Industry Literature Classification. Grant E. Arhart. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 1108-1125.

A specialized punched card system. Examples.

Books and Miscellaneous Publications

3938 How to Make Sense. Rudolf Flesch. 202 p. 1954. Harper & Brothers, New York. (P7 F63h)

A completely new scientific approach to self-analysis in personal communication. The book is its own example.

3939 Diagrams in Punched Card Computing. Fred Gruenberger. 109 p. 1954. University of Wisconsin Press, Madison. (QA75 G92d)

Diagrams illustrate what can be done with basic equipment as applied to computation centers and industrial installations.

3940 Recurrent Maladies in Scholarly Writing. Eugene S. McCartney. 141 p. 1953. University of Michigan Press, Ann Arbor. (P7 M45r)

An account of an editor's experiences as a "fault-finder", complete with amusing and instructive illustrated observations on the common mistakes of authors.

See also:
3778 (glossary for computers and automation)
3804 (digital techniques in binary numbers)
3830 (mechanized data handing)

INSTRUMENTATION AND LABORATORY APPARATUS

3941* An Automatic Conductivity Bridge for Chromatographic Analyses. (English.) Carl-Henric de Verdier and C. Iwar Sjöberg. *Acta Chemica Scandinavica,* v. 8, no. 7, 1954, p. 1161-1168.

Earlier apparatus for conductivity of effluent is discussed. Bridge contains identical measurement and comparison cells. Circuit diagrams, photographs, graphs. 9 ref.

3942* The Rapid-Oscillating Galvanometer. **Schnellschwingende Galvanometer. I.** Theoretical Principles. **Theoretische Grundlagen.** (German.) Karl Heinz Winterling. *Archiv für technisches Messen,* 1954, no. 226, Nov., p. 259-262.

Theoretical discussion on the galvanometer used primarily for recording rapidly changing electric currents. Graphs, table, diagram. 7 ref.

3943 Rotary Shunt Type Flow Meters. G. Cairns. *Canadian Chemical Processing,* v. 38, Dec. 1954, p. 80-81.

Theory, operation, and calibration. Photograph, diagram.

3944 The Use of Lead as an Adjusting Material for Analytical Weights. E. R. Harrison. *Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Technical Note* 19, Jan. 1954, 5 p. (T177 A78.2t)

Observations over several years show that weights increase in mass beyond permissible tolerances. Tables, graph, radiograph. 3 ref.

3945 A Coaxial Standing-Wave Indicator for Frequencies Near 10,000 Mc/s. F. A. Benson and G. V. G. Lusher. *Electronic Engineering,* v. 26, Dec. 1954, p. 534-537.

Design of, and some measurements with the instrument are discussed; characteristics of Si crystals suitable for use in detector. Diagrams, graphs, photograph. 3 ref.

3946* Measuring the Magnetic Properties of Test Rods by the Method of Removing the Test Rod [From the Coil]. **Izmerenie magnitnykh svoistv sterzhnevykh obraztsov metodom udaleniia obraztsa.** (Russian.) A. I. Parfent'ev and G. A. Sheneman. *Elektrichestvo,* 1954, no. 10, Oct., p. 66-68.

Direct measurement of residual magnetism. Graphs, diagram.

3947 Instrumentation. B. W. Thomas. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 71A-72A, 74A.

Dielectric constant detection monitors pipeline transportation of diversified products. Diagram. 5 ref.

3948 Automatic Recording of Dilatometer Measurements. F. G. Haynes. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 193-196.

Advantages and application of various methods. Diagram, photographs, graphs. 10 ref.

3949 Magnetic Recorders for Data Recording Under Adverse Environments. Gomer L. Davies. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Audio,* v. AU-2, no. 5, Sept.-Oct. 1954, p. 133-137. (TK1 In6.6au)

Describes types of equipment for multi-channel recording of vibration, displacement, pressure, temperature, etc. Designed to operate over wide ranges of temperatures, pressures, humidities, accelerations, and vibrations. Photographs, diagrams, oscillogram.

3950 Magnetic Recording—A Report on the State of the Art. W. T. Selsted and R. H. Snyder. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Audio,* v. Au-2, no. 5, Sept.-Oct. 1954, p. 137-144. (TK1 In6.6au)

Present recording techniques; their limitations in regard to performance, signal-to-noise ratio, speed stability, and their applications. Photographs, diagram.

3951 Instrument Society of America, Proceedings, (Annual Volume), v. 8, 1953, 331 p.

Sixty-eight papers covering instrumentation for production processes; testing and analysis instrumentation; medical, transportation, aeronautical applications; physical properties measurement.

3952 Instrumentation for Statistical Quality Control. William Hecox and Roger L. Merrill. *Instrument Society of America, Proceedings,* v. 8, 1953, p. 1-4.

Describes the development and operation of instruments for use in the statistical control of packaged-product weights. The operation of an average and range computer and their use in control and indicating systems. Photographs, diagrams, graphs. 2 ref.

3953 Instrumentation in Research and Development. *Instrument Society of America, Proceedings,* v. 8, 1953, p. 259-265.

Panel discussion includes, "The Fundamentals", Everett S. Lee; "Definitions of Research, Development and Instrumentation", C. S. Draper; "Problems Involving Adequate Instrumentation", E. P. Felch; "Problems in Research", W. G. Brombacher; "Quality of Research", C. F. Lucks; and "Making Equipment More Useful", T. C. Fletcher.

3954 Dielectric-Constant Apparatus From War Surplus. H. Bradford Thompson and Max T. Rogers. *Journal of Chemical Education,* v. 32, Jan. 1955 p. 20-23.

Apparatus requires two surplus BC-221 frequency meters. Photographs, circuit diagrams. 5 ref.

3955 An Electron Diffraction Specimen Chamber With a Specimen Vacuum Lock. R. B. Kehoe, R. C. Newman, and D. W. Pashley. *Journal of Scientific Instruments,* v. 31, Nov. 1954, p. 399-400.

Describes a new camera's novel feature of the inclusion of a cover which allows the vacuum to be maintained immediately around specimen when air is admitted to the camera. Diagrams. 3 ref.

3956 A Thermionic Ionization Gauge of High Sensitivity Employing a Magnetic Field. G. K. T. Conn and H. N. Daglish. *Journal of Scientific Instruments,* v. 31, Nov. 1954, p. 412-416.

Construction, principle, performance, and sensitivity of the gage. Graphs, diagram. 15 ref.

3957 A Modified Apparatus for Measuring the Swelling of Polymer Films in Solvents. N. Stolow. *Journal of Scientific Instruments,* v. 31, Nov. 1954, p. 416-420.

Describes an apparatus which functions at various temperatures and under diverse flow conditions. Discusses theory and derivation of formulas which accurately predict sensitivity. Graphs, diagrams. 4 ref.

3958 A Simple Microscope Attachment for Observing High-Temperature Phenomena. J. H. Welch. *Journal of Scientific Instruments,* v. 31, Dec. 1954, p. 458-462.

Small, electrically heated thermocouple, in contact with thermojunction, permits study of reactions occurring during the formation of cements and blast furnace slags. Micrographs, diagrams, circuit diagrams. 1 ref.

3959* The Mooney-Viscometer. **Das Mooney-Viscometer.** (German.) Th. Baader. *Kautschuk und Gummi,* v. 7, no. 11, Nov. 1954, p. 263WT-265WT.

Preparation of test specimens, behavior of the viscometer during the testing process, and evaluation of test results. Photographs, graphs.

3960* Compensating Microcalorimetry by Means of the Peltier and Joule Effects. **La microcalorimétrie par compensation a l'aide des effets Peltier et Joule.** (French.) Édouard Calvet. *Mémorial des services chimiques,* v. 38, no. 3, 1953, p. 209-246.

Apparatus records calorific values as a function of time with a precision of 0.1 μw. and for almost unlimited periods of time. Diagrams, graphs, table. 43 ref.

3961 Turbine Blade Temperature Telemeter. *National Bureau of Standards, Technical News Bulletin,* v. 38, Dec. 1954, p. 180-183.

Complete instrumentation system for remote indication of high temperatures includes special resistance thermometers that withstand large centrifugal forces, an inductive commutator, and electronic circuitry. Diagrams, photographs, circuit diagrams.

3962* Observations on Some Testing Methods. H. A. Hampton. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Dec. 1954, p. 1199-1207.

Describes use of a wash and scrub tester, an optical lever film thickness gage, a power drive for the Erichsen indentation tester, and a gas checking apparatus. Photograph, graph, diagrams.

3963 Angular-Dependence Light Scattering—A High Resolution Recording Instrument for the Angular Range 0.05-140°. W. Henry Aughey and F. J. Baum. *Optical Society of America, Journal,* v. 44, Nov. 1954, p. 833-837.

An optical instrument for the measurement of light scattering in physically nonhomogeneous systems. Diagrams, photographs, graphs. 7 ref.

3964 Application of the Two-Beam Interference Microscope to the Study of Surface. W. L. Grube and S. R. Rouze. *Optical Society of America, Journal,* v. 44, Nov. 1954, p. 851-860.

Includes diagrams, micrographs. 12 ref.

3965 The "Norelco" X-Ray Diffractometer. W. Parrish, E. A. Hamacher, and K. Lowitzsch. *Philips Technical Review,* v. 16, Oct. 1954, p. 123-133.

Describes a completely re-designed version of the Geiger counter X-ray spectrometer and its improved features. Diagrams, photographs, diffraction pattern, table. 5 ref.

3966* Some (More) Usual and Unusual Tool Room Measurements With a Contour Projector. A. R. Fultz. *Tooling and Production,* v. 20, Dec. 1954, p. 65-68, 134.

Applications of this instrument. Photographs, diagrams.

3967 Use of a Hot-Wire Anemometer in Shock-Tube Investigations. Darshan Singh Dosanjh. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3163, Dec. 1954, 98 p. (TL570 Un3t)

Advantages and limitations of the instrument and its application to actual wave phenomena and flow studies, and as a timing and/or triggering device. Shadowgraphs, graphs, diagrams, circuit diagrams, oscillogram. 23 ref.

Books and Miscellaneous Publications

3968 New Instrumental Methods in Electrochemistry. Paul Delahay and Charles N. Reilley. 437 p. 1954. Interscience Publishers, New York. (QD553 D37n)

Theory, instrumentation, and applications to analytical and physical chemistry.

See also:

3821 (circuits for strain gage bridges)
3929 (measurement of ignition delay)
3931 (burning rate studies)
4200 (tension-torsion creep testing machine)
4202 (indentors for hardness testing)
4205 (embrittlement of Pt/Pt-Rh thermocouples)
4215 (measurement of displacements)
4289 (dependence of microhardness on load)
4475 (measuring with radioactive tracers)
4541 (thermal diffusivity measurement)

LUBRICATION AND FRICTION

3969 The Statistical Nature of Friction. E. Rabinowicz, B. G. Rightmire, C. E. Tedholm, and R. E. Williams. *American Society of Mechanical Engineers, Paper no.* 54–LUB-2, 1954, 7 p. (TJ1075 Am35.5s)

Friction results of a series of sliding experiments are analyzed. Fluctuations in the friction force are correlated with known variables of the sliding process. Graphs, diagram. 6 ref.

Lubrication and Friction

3970 The Short Bearing Approximation for Plain Journal Bearings. G. B. DuBois and F. W. Ocvirk. *American Society of Mechanical Engineers, Paper no.* 54–LUB-5, 1954, 20 p. (TJ1075 Am35.5s)

Method of analysis eliminates need of leakage factors and makes use of charts which have both analytical and experimental support. Graphs, diagrams. 8 ref.

3971 Determination of Additive Elements in Lubricating Oils by Emission Spectrographic Methods. E. L. Gunn. *Analytical Chemistry,* v. 26, Dec. 1954, p. 1895-1899.

Determination of Ba and Ca in presence of Co; P content of new lubricants. Graphs, tables. 9 ref.

3972 Spectrographic Method for Analyzing Lubricating Greases. C. W. Key and G. D. Hoggan. *Analytical Chemistry,* v. 26, Dec. 1954, p. 1900-1902.

Measures Al, Ca, Li, Na, and Ba soaps in greases in 50 to 60 min. Diagram, tables, graph. 8 ref.

3973 New Dry Bearing. *Automobile Engineer,* v. 44, Dec. 1954, p. 567-568.

Design, advantages, and applications of a steel backed, strip type bearing lined with porous bronze impregnated with polytetrafluoroethylene. Table, photograph.

3974 Testing Ball Bearings at High Rotational Speeds. M. Graneek and H. L. Wunsch. *Engineering,* v. 178, Nov. 26, 1954, p. 695-697.

Development of an experimental machine to determine performance of high-precision bearings by measuring frictional torque under defined axial and radial loading at speeds up to 50,000 r.p.m. Diagrams, graphs.

3975 The Resistance of Some Cast and Plated Sleeve-Bearing Materials to Cavitation Erosion. R. A. Schaefer, J. F. Cerness, and H. A. Thomas. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 26, v. 31, 1954, 10 p. + 2 plates. (TS670 E25j)

Tests using H.F. vibration in oil show Ag-2% Pb and 74-10-16 Cu-Sn-Pb have promise for high speed sleeve bearings at high temperatures. Diagrams, tables, photographs, graph. 17 ref.

3976 Application of Lubricants to Rolling Mills—Problems, Developments and Trends. Wayne G. Ritter. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 78-83; disc., p. 83-86.

Design and maintenance of lubricating systems. Diagrams, table.

3977* Electrophoretic Investigation of Mechanical Impurities in Motor Oils. **Elektroforeticheskoe issledovanie mechanicheskikh primesei v motornykh maslakh.** (Russian.) S. V. Ventsel' and S. G. Teletov. *Kolloidnyi Zhurnal,* v. 16, no. 5, Sept.-Oct. 1954, p. 322-324.

Particles in used oil found to have a colloidal surface film and are charged electronegatively. Table. 3 ref.

3978* Wear Resfstance of Tractor and Internal Combustion Engine Parts Made of High Quality Cast Iron. **Iznosostoikost' detalei traktorov i dvigatelei vnutrennego sgoraniia iz vysokokachestvennykh chugunov.** (Russian.) B. N. Seredenko. *Liteinoe Proizvodstvo,* 1954, no. 8, Nov., p. 3-6.

Mechanical properties and compositions of cast irons and cast steels for various applications. Tables, graphs.

3979* Proper Lubrication of Industrial Bearings. II. *Plant,* v. 10, Dec. 1954, p. 55-59.

Properties of bearing metals. Comparative advantages of grease and oil. Photograph, micrographs, table.

3980* The Bushing Bearing, Proper Use of the Plastic Friction Bearing. **Das Mantellager, die werkstoffgerechteste Anwendungsform des Plastgleitlagers.** (German.) A. Keil. *Plaste und Kautschuk,* v. 1, no. 10, Oct. 1954, p. 233-234.

Principle, advantages, and disadvantages of a bearing in which a plastic bushing is firmly attached to the shaft.

3981* Properties of and Demands on Lubricating Oils for Diesel Engines. **Eigenschaften und Anforderungen an Schmieröle für Dieselmotoren.** (German.) J. G. Withers. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 10, Oct. 1954, p. 335-341.

Studies of lubricating properties and viscosity at low and operating temperatures, resistance to oxidation and other undesirable changes, corrosive and engine-cleaning effects. Tables, photographs, graph. 6 ref.

3982 Friction of Possible Solid Lubricants With Various Crystal Structures. Marshall B. Peterson and Robert L. Johnson. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3334, Dec. 1954, 32 p. (TL570 Un3t)

Action mechanism and lubricating effectiveness of several layer-lattice solids and an evaluation of performance compared with MoS_2. Micrographs, graphs, photographs, tables, diagram. 11 ref.

3983* Selection of Cooling-Lubricating Fluids for Finish Machining of Deep Holes in Austenitic Steel. **Vybor okhlazhdaiushche-smazyvaiushchikh zhidkostei dlia chistovoi obrabotki glubokikh otverstii v austenitnoi stali.** (Russian.) G. S. Andreev. *Vestnik Mashinostroeniia,* v. 34, no. 11, Nov. 1954, p. 39-42.

Experimentation under various conditions; types of materials used. Graph, diagrams, micrographs, photograph. 6 ref.

3984* Soaps for Wire-Drawing. H. F. Frost. *Wire Industry,* v. 21, Dec. 1954, p. 1199-1201, 1225.

Review of current practice and theory. Photographs.

Books and Miscellaneous Publications

3985 Manufacture and Application of Lubricating Greases. C. J. Boner. 977 p. 1954. Reinhold Publishing Corp., New York. (TJ1077 B64.1m)

Composition, properties, and uses; structure and theory; raw materials, processes, and manufacturing equipment; specific thickeners and additives. The effects of each ingredient or treatment upon characteristics of final product, and methods of evaluating characteristics by chemical or physical means.

See also:
3581 (lubricants)
4312 (friction in metal working processes)
4313 (lubrication of drawing dies)
4314 (lubrication of drawing dies)
4348 (lubricants for rod drawing)
4425 (lubrication of dies used in pressing powdered metals)
4427 (lubrication of metal powder bearings)

MECHANICAL ENGINEERING

3986* The Frequency of Failures Within a Group of Similar Structures. A. H. Chilver. *Aeronautical Quarterly,* v. 5, Nov. 1954, p. 235-250.

Structures varying in strength are subjected to same set of applied loads. Rate of failure governed by two simple non-dimensional parameters. Graphs, table. 3 ref.

3987 Energy Theorems and Structural Analysis. I. General Theory. J. H. Argyris. *Aircraft Engineering,* v. 26, Nov. 1954, p. 383-387, 394.

Effects of temperature, non-linear stress-strain relations. The principle of virtual forces. Diagrams. (To be continued.)

3988 Machine Tool Automation for Pontiac V-8 Production. Thomas Mac New. *Automotive Industries,* v. 111, Dec. 1, 1954, p. 56-60, 110.

Includes photographs.

3989 Engine Designers Concentrate on Torque. Joseph Geschelin. *Automotive Industries,* v. 111, Dec. 1, 1954, p. 92, 122.

Current objective is torque, not power, but they are closely related.

3990* Pumps. **Pompen.** (Dutch.) V. M. G. Kamm. *Bedrijf en Techniek,* v. 9, no. 215, Nov. 20, 1954, p. 535-540, 545.

Designs of displacement and impeller pumps; advantages and disadvantages. Pumps designed especially for the chemical industry. Diagrams, photograph.

3991* **Cost of Centrifugal Pumps.** J. A. Croes. *Chemical Engineering Costs Quarterly*, v. 4, Oct. 1954, p. 93-110.

Data for selection or replacement. Photographs, diagrams, tables, graphs.

3992 **Centrifugal Gas Compressors.** *Chemical Engineering Progress (News Section)*, v. 50, Dec. 1954, p. 39, 60, 64.

Used in large light hydrocarbon processing plant. Table, photographs.

3993* **The Distribution of Stress Round Cylindrical Openings.** J. C. Jaeger. *Chemical Metallurgical & Mining Society of South Africa, Journal*, v. 55, Nov. 1954, p. 125-128.

Mathematical analyses. Graphs, table. 6 ref.

3994* **Plane Frame for Testing Structures.** J. C. Chapman and S. R. Sparkes. *Engineer*, v. 198, Nov. 12, 1954, p. 654-655.

Describes an internally equilibrated two-dimensional testing frame designed to apply loads up to 100 tons. Photographs, diagrams. 1 ref.

3995 **Stresses in Short Beams. II. Theoretical Analysis and Conclusions.** J. S. Caswell. *Engineering*, v. 178, Nov. 19, 1954, p. 656-658.

Theory of stress distribution. Graphs, diagrams.

3996 **The Measurement of Gears.** *Engineering*, v. 178, Dec. 17, 1954, p. 789-792.

Recent developments and future trends in gear metrology and proposed establishment of a unified system of pitch tolerances. Photographs, graphs, table, diagram.

3997* **Torsional Vibration in Diesel Engines.** P. L. Rogerson. *Gas and Oil Power, (Annual Technical Review Number)*, v. 49, 1954, p. 279-282.

Causes and measurements; development of viscous dampers. Graphs, diagrams, circuit diagrams. 4 ref.

3998* The Pump in Water Works. **Die Pumpe im Wasserwerksbetrieb.** (German.) Georg Hutarew. *Gas -un Wasserfach*, v. 95, Ausgabe Wasser, no. 20, Oct. 15, 1954, p. 644-649.

Computation of lift and control of different types of pump and pump systems; possibilities of improving the efficiency of piston pumps. Diagrams, graphs, photograph.

3999 **Vibration Testing Increases Machine Tool Efficiency.** W. D. Nesbit. *Iron Age*, v. 174, Dec. 23, 1954, p. 59-61.

Vibration instruments take guesswork out of adjusting milling, turning, and grinding machines. Photographs.

4000 **Transactions of the Second Conference on Mechanisms.** *Machine Design*, v. 26, Dec. 1954, p. 187-228 + 5 pages.

Eight papers covering the fields of cam design, performance analysis, control mechanisms, and Beveloid gearing. Diagrams, graphs, photographs. 9 ref.

4001 **Sodium, a New Processing Tool.** Marshall Sittig and A. S. Hawkes. *Petroleum Refiner*, v. 33, Dec. 1954, p. 193-196.

The unique combination of physical and chemical properties has resulted in a variety of new uses for it in the petrochemical and refining industries. Diagrams, graph. 12 ref.

4002 **Is the Equipment Specialized?** Ernest V. Owen. *Petroleum Refiner*, v. 33, Dec. 1954, p. 197-206.

Review of the process equipment of the petrochemical industry with emphasis on how it compares with refinery equipment. Photographs.

4003 **Synthetic Hydraulic Fluids.** J. S. Harris. *Product Engineering*, v. 25, Dec. 1954, p. 163-166.

Data on flammability, lubricity, viscosity, stability, volatility, compressibility, non-corrosiveness, toxicity, odor conversion, and price. Tables, graphs, diagrams, photograph.

4004 **Experimental Analysis of the Buckling of Cylindrical Shells Subjected to External Hydrostatic Pressure.** E. Wenk, Jr., R. C. Slankard, and W. A. Nash. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 163-180.

Observed buckling configurations indicate boundary conditions differ from von Mises assumptions. More study is required for influence of imperfections. Photographs, tables, graphs, diagrams. 27 ref.

4005* Turbo Compressors. **Turbokompressorer.** (Norwegian.) Arne Hoel. *Teknisk Ukeblad*, v. 101, no. 38, Oct. 21, 1954, p. 837-840.

Principles, mathematics, and design. Diagrams, graphs, photographs.

4006* **Helical Carbide Cutter Design Speeds Metal Removal.** *Tooling and Production*, v. 20, Dec. 1954, p. 55-58.

Describes developments. Photographs.

Books and Miscellaneous Publications

4007 **Hydraulic Systems and Equipment.** R. Hadekel. 224 p. 1954. Cambridge University Press, London. (TJ840 H11h)

Outlines the necessary elements of fluid mechanics; discussion and solving of design problems; components of different systems.

See also:
3810 (analysis of structures)
3935 (stress analysis in turbines)
4191 (stress analysis)
4237 (effects of shock loadings)
4246 (simple column theory)
4253 (vehicle vibrations)

METALLURGY

4008* Cast Iron Crucibles. **Cadinhos de ferro fundido.** (Portuguese.) Lino Afonso de Lacerda Santos. *ABM (Boletim da associação brasileira de metais)*, v. 10, no. 34, Jan. 1954, p. 23-34.

Discusses design and shape of crucibles, molding processes, and compositions satisfactory for replacing graphite crucibles for metal melting. Diagrams, tables, photograph. 2 ref.

4009* **Steels for High Temperature Steam Pipes.** J. M. Robertson. *Alloy Metal Review*, v. 8, Dec. 1954, p. 2-7.

Factors influencing behavior of medium alloy steels at high temperatures. Graph, table.

4010* Use of Aluminum in Motors and Brakes. **Verwendung von Aluminium in Motor und Bremse.** (German.) K. Schneider. *Aluminium*, v. 30, no. 12, Dec. 1954, p. 521-528.

Experiences in Germany and the U.S.A. Tables, photographs, graphs. 21 ref.

4011* Induction and Electric-Arc Furnaces. **Inductie- en lichtboogovens.** (Dutch.) *Bedrijf en Techniek*, v. 9, no. 213, Oct. 23, 1954, p. 491-493. 502.

Characteristics and uses of above furnaces as used primarily in the metals industry. Photographs.

4012* New Data on Carbide Core Bits and Drills. **Neuzeitliche Erkenntnisse über Hartmetallbohrkronen und Hartmetallbohrer.** (German.) H. Wilde. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 99, no. 10, Oct. 1954, p. 188-193.

Advantages of carbide bits and drills, especially of those using spiral cutting edges. Diagrams, photographs, table, graph.

4013 **The Mystery Metal Lithium.** A. F. G. Cadenhead. *Canadian Metals*, v. 17, Dec. 1954, p. 18, 20.

Sources, properties, uses, and cost.

4014 **Metals in 1954.** A. A. Watts and G. K. Manning. *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 119-122.

Post-Korea slump cushioned by expanding construction and government support. Technical progress.

4015* Advances in the Metallurgy of Ferrous Materials. **Fortschritte der Metallurgie der Eisenwerkstoffe.** (German.)

Metallurgy

A. Keller. *Chimia (Switzerland)*, v. 8, no. 11, Nov. 15, 1954, p. 245-255.

Review of literature on the entire field ranging from ore beneficiation, smelting, refining, and casting. 105 ref. (To be continued)

4016 Castings *versus* Weldments. H. Mottram. *Foundry Trade Journal*, v. 97, Dec. 9, 1954, p. 687-697.

Comparison of properties, availability, and production costs favors weldments in many cases. Castings are favored for large lots, heavy sections, and special materials. Diagrams.

4017* Forming and Annealing of Molybdenum. **Tváření a žíhání molybdenu.** (Czech.) Jiří Vacek. *Hutnické Listy*, v. 9, no. 7, July 1954, p. 417-421.

Powder metallurgy and melting methods for producing plates and sheets; mechanical and physical properties. Graphs, tables. 11 ref.

4018* Cold Rolled Steel Sheet. **Ocelový plech válcovaný za studena.** (Czech.) Augustin Havlík. *Hutnické Listy*, v. 9, no. 11, Nov. 1954, p. 647-650 + 2 plates.

Rolling conditions and equipment; heat treatments; mechanical properties; applications; microstructures. Tables, photographs, micrographs. 6 ref.

4019 Industrial Hygiene. H. H. Schrenk. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 99A-100A, 102A.

Zirconium a "new" metal is non-toxic and shows therapeutic value. The metal is used in bone repair. 2 ref.

4020 New Stainless Alloy "Bridges Gap" Between 300 and 400 Series. A. J. Lena. *Iron Age*, v. 174, Dec. 2, 1954, p. 113-116.

New steel is austenitic when annealed but can be hardened by precipitation or by sub-zero cooling. Tables, graph, photograph.

4021 Magnesium in the Fabrication of Guided Missles. A. J. Bell. *Light Metal Age*, v. 11, Dec. 1954, p. 25-27.

Advantages, limitations, and design considerations for use of Mg alloys. Photographs.

4022 Designing With Aluminum. IX. Choosing an Aluminum Casting Alloy & Heat-Treatment. *Materials & Methods*, v. 40, Dec. 1954, p. 15-18.

Data sheets listing mechanical properties and casting characteristics.

4023 Materials Engineering File Facts. Cast Aluminum Bronzes. *Materials & Methods*, v. 40, Dec. 1954, p. 135.

Compositions, mechanical, physical and fabricating properties, heat treatment, and corrosion resistance.

4024 Beryllium as an Alloying Addition. L. David. *Metallurgia*, v. 50, no. 301, Nov. 1954, p. 236-238.

Effects of small additions of Be to alloys of Mg, Al, Ni, and Cu. Mechanical properties of Cu-Be alloys.

4025* Ferro-Alloys and Mixtures of Cast Irons. **Ferro-alliages et mélanges de fontes.** (French.) J. Pascal. *Métallurgie et la construction méchanique*, v. 86, no. 10, Oct. 1954, p. 733 + 4 pages.

Composition of ferrosilicons and ferromanganeses; examples of cast irons using ferro alloys. Graphs, micrographs. 6 ref.

4026 The Application of Metal Powder Association Core Standards and Data Sheets. Lester M. Becker. *Metal Powder Association, Proceedings*, v. 2, 1954, p. 91-98. (TN695 M56p)

Review of progress in standardization of dimensions and properties of powdered Fe cores by the Electronic Core Division. Photographs, table, diagrams.

4027 The Copper Industry in Australia. A. L. Simmons. *Metal Progress*, v. 67, Jan. 1955, p. 87-92.

Ore reserves; production from new workings and fabricating capacity. Map, photographs, table. 4 ref.

4028 Contemporary Metal Processing Techniques in Russia. N. H. Polakowski. *Metal Progress*, v. 67, Jan. 1955, p. 98-103.

Clues of the progress being made; inferences instilled by the studious omission of news from countless branches of metallurgical endeavor. Diagrams.

4029 A Turbine-Blade Alloy Castable and Low in Cobalt and Columbium. W. Siegfried and F. Eisermann. *Metal Progress*, v. 67, Jan. 1955, p. 141-146.

Outline of systematic work to discover a "superalloy" capable of investment casting (mass production) and economical in scarce alloying metals. Diagrams, graphs, photographs, table.

4030* A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 21, Dec. 1954, p. 563-568.

Defines "oriental emerald" to "oxidizing agent". Tables, diagrams, graphs.

4031 Impurities in Metals. H. W. Greenwood. *Metal Treatment and Drop Forging*, v. 21, Dec. 1954, p. 571-573.

Role of some impurities in providing desired electrical, magnetic, machining, and hardening characteristics in various metals.

4032* Theory Relative to the Influence of Hexagonal Elements and Compounds in Polycrystalline Groups. **Théorie relative à l'influence des éléments et composés hexagonaux dans les ensembles polycristallins.** (French.) A. Paudrat. *Métaux Corrosion-Industries*, v. 29, no. 350, Oct. 1954, p. 372-379.

Discussion of sulfonitration and sulfocementation; production of free-cutting steels; decrease of properties of S steels during cooling and heating; fretting corrosion. Diagrams. 34 ref.

4033* Titanium in Jet Engines. D. C. Goldberg. *Modern Metals*, v. 10, Dec. 1954, p. 42-43.

How Ti holds the key to supersonic flight. Photographs.

4034* Manufacturing Conditions and Properties of Modified Cast Iron. **A módosított öntöttvas gyártási feltételei és tulajdonságai. II.** (Hungarian.) Ferenc Varga, Béla Kőrös, Elek Chapó, Kázmér Jánossy, and Rezső Sima. *Öntöde*, v. 5, no. 9, Sept. 1954, p. 193-208.

Extensive investigations for the purpose of determining data for introduction of the Fe. Tables, graphs, micrographs. 15 ref.

4035* Recasting of Aircraft Scrap Into Alloys of Duralumin Type. **Przeróbz złomu samolotowego na stopy typu duraluminu.** (Polish.) E. Zembala and M. Orman. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 5, 1954, p. 239-246.

Pilot and industrial scale tests. Sorting, melting, alloying, rolling, and properties of products. Tables, diagram. 11 ref.

4036* Use of Brass and German Silver in the Clock and Watch-Making Industry. **L'emploi des laitons et des maillechorts en horlogerie.** (French and German.) W. Brandt. *Pro-Metal*, v. 6, no. 41, Oct. 1954, p. 403-410.

General survey of Swiss production. Photographs, table, micrograph.

4037* Sets of Extruded Bars in First and Second Class Installations. **Les jeux de barres en profilés dans les installations de première et deuxième catégories. III.** (French.) René Rols. *Revue de l'aluminium*, v. 31, no. 214, Oct. 1954, p. 307-313.

Electrodynamic forces in extruded bars; arrangement of bars; spacing; mounting of conductors. Drawings, photographs. (To be continued.)

4038* Some Properties of Spheroidal Iron Inoculated With Dowmetal. **Některé vlastnosti tvárné litiny očkované elektronem.** (Czech.) Zdeněk Hostinský and Čestmír Hloušek. *Slévárenství*, v. 2, no. 11; *Práce Československého Výzkumu Slévárenského*, v. 1, no. 12, Nov. 1954, p. 77-88.

Casting behavior, mechanical properties, corrosion resistance, and applications. Diagrams, tables, micrographs, graphs, photographs. 93 ref.

4039 Forum on Technical Progress. *Steel*, v. 136, Jan. 3, 1955, p. 193 + 89 pages.

Brief statements by 250 recognized authorities on technological developments.

4040 Ryerson Practices What It Preaches. *Steel Horizons*, v. 16, Fourth quarter, 1954, p. 6-7.

Use of stainless steel for factory structures. Photographs.

4041 Steel for Radially Stressed Heavy Forgings. Otto Krifka. *Steel Processing*, v. 40, Dec. 1954, p. 757-766. (Reprinted from *Stahl und Eisen*, v. 74, no. 12, June 3, 1954, p. 760-768.)

Previously abstracted from original. See item 13125, v. 3, 1954.

4042* Zicral. Comparison of High-Resistance Alloys With Other Light Alloys From the Point of View of Heat Treatment, Shaping, Surface State, Protection, Etc. **Zicral. Comparison des alliages a haute résistance avec les autres alliages légers au point de vue: traitement thermique, formage, état de surface, protection, etc.** (French.) R. Lachenaud. *Technique et science aéronautiques*, 1954, no. 4, p. 287-297.

Discusses characteristics and behavior of high-resistance Al-Zn-Mg-Cu alloy with 8% Zn. Graphs, tables, photograph. 5 ref.

4043* Equivalent Carbide Grades. *Tool Engineer*, v. 34, Jan. 1955, p. 117.

Reference table of ten manufacturers' recommendation for standard grades. Table.

4044 Criteria in the Selection of Materials for Aircraft Gas-Turbines. H. Hanink and L. Luini. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 122-147. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

The need of increasingly effective cooperation of designers and metallurgists in providing materials for more efficient power plants. Photographs, diagram, graphs, table.

4045 Production and Fabrication of Heat Resistant Alloys From the Producers' Viewpoint. C. T. Evans, Jr. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 148-183. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

Review of existing practices, problems, and accomplishments. Photographs, tables, diagrams. 15 ref.

4046 Fabrication of High Temperature Alloy Steel Piping Suitable for Central Station and Oil Refinery Service. R. W. Emerson. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 184-218. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

Metallurgical characteristics of piping materials; fabricating operations; heat treatments; welding; inspection methods. Table, graphs, micrographs, photographs.

4047 Metallurgical Variables Influencing Properties of Heat Resistant Alloys. J. W. Freeman, C. L. Corey, and A. I. Rush. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 244-265. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

Influence of melting practice, composition, forming procedures, and heat treatment on creep, rupture, fatigue, stress concentrations, mechanical and thermal shock, thermal gradients, and corrosion. Graphs, tables, micrographs. 23 ref.

4048 A Chronological List of the Publications of Albert Easton White. B. A. Uhlendorf, compiler. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 272-288. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

List covering the period 1911 through 1952 and subjects ranging from iron ore briquettes to properties and applications of metals and alloys. 168 entries.

4049* Aluminum: How It Compares With Other Metals. *Western Machinery and Steel World*, v. 45, Dec. 1954, p. 93-95.

Data to assist in selecting right material for a given product. Tables, photographs.

Books and Miscellaneous Publications

4050 Basic Metallurgy. Principles. A. W. Grosvenor, editor. v. I. 697 p. 1954. American Society for Metals, Cleveland. (TN665 Am35b)

Textbook compiled for use in the two-year evening course sponsored by the Philadelphia chapter, ASM, Temple University, and local industries. Covers chemistry and physics, mechanical properties, extractive metallurgy, phase diagrams, transformations, shaping, fabrication, and heat treatments of ferrous and non-ferrous alloys.

4051 Nickel in Iron and Steel. A. M. Hall. 595 p. 1954. John Wiley & Sons, New York. (TN757.N5 H14n)

Reviews and correlates published data concerning occurrence and refining of Ni, production and properties of irons and steels containing Ni, and data for various applications.

4052* Liquid Metals Handbook. Richard N. Lyon, editor. 2nd Rev. Ed. 269 p. 1954. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. (TA459 L66h)

Properties of metals melting below 660 C. Emphasis is on heat transfer applications.

4053 Metallurgy of the Rarer Metals. Zirconium. G. L. Miller. v. II. 382 p. 1954. Academic Press, New York. (TN798 M56)

History and occurrence; uses of pure metal and commercial alloys; production and properties of alloys and compounds.

4054 Metallurgy of the Rarer Metals. Chromium. A. H. Sully. v. I. 272 p. 1954. Academic Press, New York. (TN798 M56)

History and occurrence, production and properties of pure Cr, electroplating techniques and applications, uses and properties of alloys.

4055 Utilization of Heat Resistant Alloys. 288 p. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

A symposium consisting of 11 papers covering mechanical properties, acceptance testing, manufacture, design criteria, and applications of high temperature alloys. Papers are individually abstracted.

4056 ASTM Standards on Copper and Copper Alloys. ASTM Committee B-5. 586 p. Sept. 1954. American Society for Testing Materials, Philadelphia. (TA480.C7 Am35s)

See also:
3283 (refractoriness tests)
4001 (applications of metallic Na)

METALS—EXTRACTION AND REFINING

4057* Model Experiments on the Low-Temperature Smelting Process. **Modellversuche zum Schwelverhüttungs-Verfahren.** (German.) Helmut Maetz and Hans-Jürgen Engell. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 397-404.

Experiments on the reduction of Fe ore with ore-coal briquets and CO, designed primarily to find economical use of low-quality coal for this purpose. Diagram, table, graphs. 12 ref.

4058* Reduction of Ferric Oxides by Graphite. **O vosstanovlenii okislov zheleza grafitom.** (Russian.) V. I. Arkharov, V. N. Bogoslavskii, M. G. Zhuravleva, and G. I. Chufarov. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 803-806.

Reduction at temperatures from 1000 to 1150 C in vacuum; mechanism of the crystallochemical transformations. Graph, table. 7 ref.

4059* Effects of Residual Elements and Gases on Product Quality. **Vliv zbytkových prvků a plynů na jakost ocelových výrobků.** (Czech.) Miroslav Šícha. *Hutnické Listy*, v. 9, no. 7, July 1954, p. 386-397.

Causes and sources of inclusions and residual components. Effects on mechanical properties. Diagrams, photographs, tables, micrographs. 23 ref.

4060* Preparation of Zr and Zirconium Hydride for Vacuum Refining. **Příprava zirkonia a hydridu zirkonia pro účely**

Metals—Extraction and Refining

vakuové techniky. (Czech.) František Plzák. *Hutnické Listy*, v. 9, no. 11, Nov. 1954, p. 650-655.

Equipment and processes for producing Zr from zircon. Diagrams, photographs, micrographs. 10 ref.

4061 The Development of Melting Techniques for Titanium and Zirconium. G. L. Miller. *Industrial Chemist and Chemical Manufacturer*, v. 30, Dec. 1954, p. 577-584.

A review; 13 systems are diagrammed and explained. Photograph. 17 ref.

4062 The Electrodeposition and Refining of High-Grade Chromium. H. T. Greenaway. *Institute of Metals, Journal*, v. 83, Dec. 1954, p. 121-125.

Apparatus, materials, and processes for production of high-purity Cr. Tables, graph, diagram. 9 ref.

4063 Direct Chill Continuous Casting of Magnesium Proves Practical, Economical. R. K. Paddock. *Iron Age*, v. 174, Dec. 9, 1954, p. 149-151.

Equipment and processes for production of Mg alloy ingots. Diagrams, photographs.

4064 Convection and the Heating of Scrap. L. F. Daws and R. D. Collins. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 349-353.

Penetration of charge by open-hearth combustion gases reduces heating times by significant amounts. Graphs. 3 ref.

4065 Thermodynamic Calculation of Slag Equilibria. II. Influence on Cation Exchange Equilibria Caused by Cations Not Taking Part in the Exchange. K. Grjotheim. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 354-356.

Theoretical explanation of experimental data. Table, graph. 5 ref.

4066 The Sulphur Distribution Reaction Between Blast-Furnace Slag and Metal. J. Taylor and J. J. Stobo. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 360-367.

A reaction mechanism is suggested. Diagram, graphs, tables. 15 ref.

4067 Use of Cold Coke-Oven Gas and Pitch-Cresote Firing on Tilting Furnaces. Development at Appleby-Frodingham. W. Jackson. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 378-390.

Effects of change in firing practice on fuel and refractory consumption, output rates, burden, and oxidation rates in two furnaces. Diagrams, tables. 3 ref.

4068 High-Temperature Water Cooling of O.H. Furnaces by Steam-Producing Elements. F. J. Feltoe and P. M. Moreton. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 391-395.

Developments in the German steel industry. Cost advantages. Diagrams, graph, table.

4069 Preliminary Studies on the Properties of Calcium Carbide for Metallurgical Purposes. C. E. A. Shanahan and F. Cooke. *Journal of Applied Chemistry*, v. 4, Nov. 1954, p. 602-611.

A CaC_2 bearing slag is sought for steel desulfurization. Tables, diagrams, graphs. 15 ref.

4070 Vacuum Melting Improves Alloy Properties and Workability. R. K. McKechnie, D. W. Green, and W. F. Moore. *Journal of Metals*, v. 6, Dec. 1954, p. 1364-1367.

Construction and operation of furnace; workability and mechanical properties of Ni base alloy. Graphs, photographs, tables, micrograph. 4 ref.

4071 Promises and Problems Posed by Vacuum Melting. James H. Moore. *Journal of Metals*, v. 6, Dec. 1954, p. 1368-1369.

Vacuum melting greatly improves mechanical properties of ferritic stainless steels. Operational problems. Photograph, graphs.

4072 Bright Future Predicted for Vacuum Melted Metals in Chemical Industry. E. M. Mahla. *Journal of Metals*, v. 6, Dec. 1954, p. 1370-1371.

Vacuum melted steels show improved mechanical and corrosion properties. Photograph, micrographs. 1 ref.

4073 Carbon and Graphite Electrodes Evaluated for Use in Ferroalloy Furnaces. R. S. Hogue, R. L. Westlake, and G. M. Moga. *Journal of Metals*, v. 6, Dec. 1954, p. 1379-1382.

Factors influencing design and selection of electrodes. Photographs, tables, graphs.

4074 Ionic Nature of Liquid Iron-Silicate Slags. M. T. Simnad, G. Derge, and I. George. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Dec. 1954, p. 1386-1390.

Physical and chemical properties of slags of various compositions. Test equipment and procedures. Diagrams, tables, graph. 17 ref.

4075 Inclusions in Steel From Pouring Refractories. D. J. Carney and E. C. Rudolphy. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Dec. 1954, p. 1391-1395.

Nozzles and wells were found to be greatest contributors. Recommendations for minimizing inclusions. Tables, micrographs, photographs. 5 ref.

4076 Analysis of Factors That Limit the Production Rate and Coke Rate in the Iron Blast Furnace. W. O. Philbrook. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Dec. 1954, p. 1396-1406.

Interrelations among pressure drop, gas flow, and charge characteristics. Factors limiting ore size. Table, graphs. 20 ref.

4077* Economical Utilization of Steel Scrap Containing Chromium by Oxygen Blast. **Krómtartalmú acélhulladék gazdaságos felhasználása oxigén befuvással.** (Hungarian.) Erno Weigl. *Kohászati Lápok*, v. 9, no. 11, Nov. 1954, p. 490-492.

Hungarian investigations on three experimental charges with varying O concentrations in the blast. Graphs.

4078* The Effect of the Casting Skin on Aluminum Ingots Cast Into Water on the Properties of Plates Prepared From Them. **Vízbeöntött alumíniumtuskók öntési kérgének befolyása a belőlük készített lemezek tulajdonságaira.** (Hungarian.) András Domony and Rezső Várhelyi. *Kohászati Lapok*, v. 9, no. 11, Nov. 1954, p. 505-508.

Hungarian investigations on high-purity, continuously cast ingots. Experimental details, results of microscopic, and corrosion resistance tests. Evaluation of results. Diagram, micrographs, tables. 6 ref.

4079* Remelting Zinc and Copper Cathodes in Large Electrically Heated Furnaces. **Das Umschmelzen von Zink- und Kupferkathoden in elektrisch beheizten Grossraumöfen.** (German.) J. Tostmann. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 853-857.

Equipment and practices. Diagram, photographs, charts. 4 ref.

4080* Oxygen in Metallurgy. **L'ossigeno in siderurgia.** (Italian.) G. Husson. *Metallurgia italiana*, v. 46, no. 9, Sept. 1954, p. 297-310; disc., p. 310-311.

Uses and developments in various steelmaking furnaces since 1940. Micrograph, photographs, table, graphs. 37 ref.

4081* Experiences and Improvements in the Casting of Foundry Pig Iron on the Pig-Casting Machine of the VEB Eisenwerke West in Calbe (Saale). **Erfahrungen und Verbesserungen beim Vergiessen von Giessereiroheisen auf der Masselgiessmaschine des VEB Eisenwerke West in Calbe (Saale).** (German.) Hans-Joachim Lux. *Metallurgie und Giessereitechnik*, v. 4, no. 10, Oct. 1954, p. 446-449.

Includes photographs.

4082 Pig Iron Made From Low-Grade Fine Ore and Noncoking Coal. *Metal Progress*, v. 67, Jan. 1955, p. 81-86.

Construction and operating experience of semicommercial low-shaft blast furnace. Diagrams, photographs.

4083 French Steelmaking Progress in 1954. G. Husson. *Metal Progress,* v. 67, Jan. 1955, p. 127-128, 202, 204.

Optical pyrometers are being attached to converters and the blast (air plus O and steam) regulated so melt is cool until just before the end of the blow. Open-hearth research in France is centered on gas movements, combustion, and the control of S from high-S fuel oil.

4084* Determination of the End of the Basic Bessemer Reaction. Measurement and Recording of the True Temperature of the Converter Flame. **Signal d'arrêt de l'opération Thomas. Mesure et enregistrement de la température vraie de la flamme du convertisseur.** (French.) J. Galey, P. Leroy, and M. Denis. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 795-809.

Opacity of flame as a function of time determines end of blow. Instrumentation. Tables, graphs, diagrams, micrographs. 7 ref.

4085* New Method of Producing Aluminum-Magnesium Alloys. **Nový výrobní postup při legování hliníkových slitin hořčíkem.** (Czech.) Adolf Valášek. *Slévárenství,* v. 2, no. 9, Sept. 1954, p. 265-267.

Advantages of using Al-Mg master alloys with 10 to 35% Mg. Graph, table.

4086* Current Development of Oil-Fired Open-Hearth Furnaces in Austria. **Die bisherige Entwicklung ölgefeuerter Siemens-Martin-Öfen in Österreich.** (German.) Fritz Hönig-Hönigsberg. *Stahl und Eisen,* v. 74, no. 24, Nov. 18, 1954, p. 1583-1591.

Designs; heat economy; refractories; performance; conversion from gas firing. Tables, diagrams, photographs. 10 ref.

4087* Investigations on the Movement of Nitrogen During the Combustion of Carbon. **Untersuchungen der Stickstoffbewegung während der Kohlenstoffverbrennung.** (German.) Karl Georg Speith and Helmut Bücken. *Stahl und Eisen,* v. 74, no. 25, Dec. 2, 1954, p. 1648-1650.

Reduction of N absorption by prolonging the basic Bessemer blow. Removal of N by top blowing with pure O. Graphs.

4088* Investigations on the Effect of Limestone Additions on Nitrogen Absorption During Air Refining. **Über die Wirkung von Kalksteinzusätzen auf die Stickstoffaufnahme beim Windfrischen.** (German.) Karl Georg Speith and Helmut Bücken. *Stahl und Eisen,* v. 74, no. 25, Dec. 2, 1954, p. 1650-1652.

Equilibria in converter gases. Refining action and additional gas evolution due to limestone additions. Graphs. 4 ref.

4089* Correlation Between Furnace Design and Wear of the Refractory Lining in the Blast Furnace. **Zusammenhang zwischen Ofenbauart und Verschleiss der feurefesten Auskleidung im Hochofen.** (German.) Heinrich Kahlhöfer and Alfred Send. *Stahl und Eisen,* v. 74, no. 26, Dec. 16, 1954, p. 1697-1713.

Review of developments. Prevention of salamander formation. Use of C brick. Diagrams, photographs, graphs. 32 ref.

4090 Correlating Blast Furnace Operating Concepts. V-VI. Charles E. Agnew. *Steel,* v. 135, Dec. 20, 1954, p. 84, 86, 88; Dec. 27, 1954, p. 68-71.

Volatile-free magnetite reduces heat requirements; changes in practice caused by present ore supplies.

See also:
3274 (blast furnace linings)
3857 (costs of steel producing processes)

METALS—FINISHING, POLISHING, AND CLEANING

4091 Adhesion and Surface Preparation in Protective Metal Spraying. III. Industrial Grit Blasting Machines. J. M. Cowan. *Electroplating and Metal Finishing,* v. 7, Dec. 1954, p. 469-473.

Types of equipment and principles on which they operate. Diagrams, photographs. (To be continued.)

4092* **Finishing Aluminium Castings.** *Industrial Finishing (London),* v. 7, Sept. 1954, p. 116 + 6 pages.

Discusses mechanical, paint, electroplated, anodised and vitreous enamel finishes, and hard surfacing processes. Photographs. 2 ref.

4093 Notes on Cleaning Cycles for Plating. A. Kenneth Graham. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 17, v. 31, 1954, 8 p. (TS670 E25j)

Procedures suitable for cleaning steel, Cu, and Ni prior to Ni plating. Tables. 4 ref.

4094 The Examination of Surface Topography by Interferometric Methods. W. D. Biggs. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 179-181.

Techniques of interferometry; applications. 16 ref.

4095 In-Line Pickling Setup Aids Continuous Production. P. K. Dubin and F. A. Locke. *Iron Age,* v. 174, Dec. 23, 1954, p. 62-64.

New developments permit fume-free integration of pickling in production lines. Photographs, diagram.

4096 Surface Treatments Improve Properties, Broaden Uses for Aluminum. II. C. C. Cohn. *Iron Age,* v. 174, Dec. 23, 1954, p. 65-68.

Characteristics and applications of electric, organic solvent, etching, alkali, acid, and ultrasonic cleaning methods. Photographs, tables.

4097 How to Avoid Titanium Embrittlement During Pickling. H. B. Bomberger, M. B. Vordahl, and W. L. Finlay. *Materials & Methods,* v. 40, Dec. 1954, p. 105.

A fluorine acid or salt added to nitric acid is best pickling solution. Photograph, graph.

4098* **Modern Barrel Finishing.** *Mechanical World and Engineering Record,* v. 134, Dec. 1954, p. 546-547.

Advanced technique assures uniformity of finish with low μ in. surfaces in addition to being economical in operation. Graph, diagram.

4099* Surface Preparation of Ferrous Metals. **Préparation superficielle des métaux ferreux.** (French.) J. Liger. *Métallurgie et la construction méchanique,* v. 86, no. 10, Oct. 1954, p. 763, 765, 767.

Nature of impurities and imperfections that surface preparation tries to eliminate. (To be continued.)

4100* Cleaning of Metallic Structures With the Oxyacetylene Torch. **Le décapage des constructions métalliques au chalumeau oxy-acétylénique.** (French.) E. Sellier and C. Robeyns. *Ossature métallique,* v. 19, no. 12, Dec. 1954, p. 599-602.

Principle, technique, various applications for derusting sheet steel, cleaning forged or cast pieces, burning of deteriorated paint, etc. Photographs.

See also:
3673 (pickling tank heaters)
4235 (buffing of Cu plate)

METALS—FOUNDRY PRACTICE

4101* Casting of Corrosion-Resistant, High-Silicon Cast Iron Pieces. **Fundição de peças de ferro fundido de alto silício, resistentes à corrosão.** (Portuguese.) Lino Afonso de Lacerda Santos. *ABM (Boletim da associação brasileira de metais),* v. 10, no. 34, Jan. 1954, p. 33-42.

Properties and characteristics of Fe with Si between 13 and 17%. Photographs, micrographs. 3 ref.

4102 Automation in Core Making. C. W. Hockman. *American Foundryman,* v. 26, Dec. 1954, p. 36-40.

Experience with automatic, five-station, rotary core blowing machines. Photographs, diagram.

4103 Holding Blast Humidity Constant. Joseph L. Brooks. *American Foundryman,* v. 26, Dec. 1954, p. 41-43.

Effects of cupola blast humidity on melt properties. Control techniques. Graph, micrographs, diagram, photograph. 5 ref.

Metals—Foundry Practice

4104 What Is Silica Sand? Clyde A. Sanders and O. Jay Myers. *American Foundryman*, v. 26, Dec. 1954, p. 56-59.
Definitions of terms used in foundry technology. Micrographs, photographs, diagram. 20 ref.

4105 How to Prevent Copper-Base Alloy Casting Defects. *American Foundryman*, v. 26, Dec. 1954, p. 61-63.
Description of various defects and ways to eliminate them. Photograph.

4106 Malleable Gating. Lawrence Winings. *American Foundryman*, v. 27, Jan. 1955, p. 35-40.
Influence of casting design on gating practice. Photographs.

4107 Melting and Pouring Bronze. A. E. Cartwright. *American Foundryman*, v. 27, Jan. 1955, p. 50-56.
Techniques and practices that have been proven by experience. Photographs.

4108 What High-Temperature Tests Tell About Core Knockout. Victor M. Rowell. *American Foundryman*, v. 27, Jan. 1955, p. 57-59.
Résumé of report by AFS Committee on Physical Properties of Iron Foundry Molding Materials at Elevated Temperatures. Photograph, tables.

4109* Measurement of the Moisture Content of Sand. R. G. Godding. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Dec. 1954, p. 473-480 + 2 plates.
Apparatus and its limitations. Diagram, tables, photographs, graphs. 1 ref.

4110* Shell Moulding Materials: Their Testing and Properties. D. A. Taylor. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Dec. 1954, p. 502-516 + 4 plates.
Test equipment can show effects of curing temperature, time, resin and clay content, and properties of molding sands. Diagrams, photographs, tables, graphs, micrographs.

4111 Gray Iron Casting With Exothermic Feeding. II. V. Grice. *Canadian Metals*, v. 17, Dec. 1954, p. 30, 32.
Substantial savings can be obtained where large volumes of metal are to be fed. Photographs, diagrams.

4112 Growing Competence in High Pressure Molding. W. R. Adams. *Canadian Metals*, v. 17, Dec. 1954, p. 34, 36, 38.
Latests developments applicable to large and small foundries. Diagrams.

4113* The Shell Moulding Process. W. A. Campbell. *Engineering Journal*, v. 37, Dec. 1954, p. 1610-1612.
Mechanics and advantages of the process. Photographs.

4114* Study of the Flow of Metal in Molds. Practical Application of Scientific Principles. Results. **Étude de l'écoulement du métal dans les moules. Application pratique des principes scientifiques. Résultats.** (French.) Charles Trencklé. *Fonderie*, 1954, no. 106, Nov., p. 4207-4226; disc., p. 4226-4228.
Machine or hand-molded flat pieces cast in green sand with ordinary cast iron. Graphs, diagrams, tables, micrographs. 12 ref.

4115* A Large Dutch Foundry's Experience, After the War, With the Cement Sand Molding Method. **Une grande fonderie neerlandaise expérimente, après la guerre, la méthode de moulage en sable au ciment.** (French.) A. de Bruin. *Fonderie*, 1954, no. 106, Nov., p. 4229-4234.
Discusses reorganization of shops and training of personnel in cement sand molding procedures. Photographs, diagrams, graph.

4116 Shell Molding Is Easier. Ray Olson. *Foundry*, v. 83, Jan. 1955, p. 76-79, 148, 150.
New equipment and techniques make the process easier and less expensive. Photographs.

4117 Front-Slagging Cupolas. W. W. Levi. *Foundry*, v. 83, Jan. 1955, p. 80-83.
Advantages and construction of furnace. Diagram, photographs.

4118 Aluminum Sand Foundry Practice. W. D. Stewart. *Foundry*, v. 83, Jan. 1955, p. 88-91, 216-220, 222.
Foundamentals of Al foundry practice. Photographs.

4119 Hot Blast Systems. Garnet P. Phillips. *Foundry*, v. 83, Jan. 1955, p. 92 + 10 pages.
Various cupola preheating systems used in common practice. Diagrams.

4120 Molding System Is Highly Automated. Robert H. Herrmann. *Foundry*, v. 83, Jan. 1955, p. 110, 113, 116, 118.
Closed circuit system in which green sand molds are made, closed, shaken out, and the flasks separated and returned continuously. Diagram, photographs.

4121 Aspects of Metallurgical Control in the Modern Steel Foundry. N. Y. Newton. *Foundry Trade Journal*, v. 97, Nov. 25, 1954, p. 625-630.
Factors influencing quality of alloy steel castings and their control. Diagrams, photographs, table.

4122* Predetermining the Gas Permeability of Core Sands by the Volume Number. **Die Vorausbestimmung der Gasdurchlässigkeit von Kernsanden durch die Volumenzahl.** (German.) Horst-Werner Wenig. *Giesserei*, v. 41, no. 22, Oct. 28, 1954, p. 593-595.
Rapid experimental determination using ratio of absolute vol. to apparent vol. Graphs, diagrams, table. 5 ref.

4123* Correct Selection of Line Frequency Crucible Furnaces for the Gray-Iron Foundry. **Die richtige Auswahl von Netzfrequenz-Tiegelöfen für die Graugiesserei** (German.) Karl Heinz Brokmeier. *Giesserei*, v. 41, no. 22, Oct. 28, 1954, p. 595-598.
Suggestions from standpoint of efficiency and economy. Graphs.

4124* Technique of Molding in the Iron Foundry. **Formtechnik in der Eisengiesserei.** (German.) Gustav Vedder. *Giesserei*, v. 41, no. 23, Nov. 11, 1954, p. 628-631.
Production of molds, gating technique, pouring basins to retain slag, risers, green- dry- and cement-sand casting, dies, and chill molds. Diagrams.

4125* The Deoxidation of Cast Iron Melts by Subsequent Treatment and Its Effect on the Structure. **Die Desoxydation von Gusseisenschmelzen durch Nachbehandlung und ihr Einfluss auf das Gefüge.** (German.) Hans Schiffers. *Giesserei*, v. 41, no. 25, Dec. 9, 1954, p. 661-672.
Effect of ladle additions; crystallization of nodular graphite. Tables, graphs, micrographs. 38 ref.

4126* Feeding and Solidification. **Matning och stelnande.** (Swedish.) K. Åkesson. *Gjuteriet*, v. 44, no. 10, Oct. 1954, p. 170-179.
Thermal properties of molding materials and cast metals. Methods of determining rate and time of solidification. Graphs, tables, diagrams. 17 ref.

4127 Plaster Mold Process Gives Better Aluminum, Magnesium Castings. G. R. Gardner. *Iron Age*, v. 175, Jan. 13, 1955, p. 88-90.
Technique for producing thin-walled castings with smooth surfaces and good mechanical properties. Diagrams, photographs.

4128 Modern Manufacture and Use of Cast Rolling Mill Rolls. F. H. Allison, Jr. and C. E. Peterson. *Iron and Steel Engineer*, v. 31, Dec. 1954, p. 68-76; disc., p. 76-77.
Foundry procedures and advantages of cast iron and cast steel rolls. Diagrams, photographs, micrographs, tables, graphs. 2 ref.

4129 Electric Furnace Melting Practices Compared for High Alloy Steel Production. P. R. Gouwens. *Journal of Metals*, v. 6, Dec. 1954, p. 1372-1375.
Comparison of acid dead melting, acid oxygen, and basic oxygen practices for stainless steel castings. Tables, photograph, graph. 6 ref.

4130 Hot Chamber Magnesium Die Casting. F. C. Bennett. *Light Metal Age*, v. 11, Dec. 1954, p. 22-24.

Construction and operation of successful machine. Photographs.

4131* Seasonal Cas Porosity in Al-Si Alloy Ingots. **Sezonnaia gazovaia poristost' otlivok iz aliuminievo-kremnistykh splavov.** (Russian.) A. A. Gorshkov and S. V. Vargin. *Liteinoe Proizvodstvo*, 1954, no. 8, Nov., p. 14-16.

Use of gaseous Cl in the melt prevents absorption of H from air during periods of high humidity. Tables, graphs, micrograph. 12 ref.

4132* Influence of Mold Temperature and Vacuum in It on Fluidity of Steel. **Vliianie temperatury formy i razriazheniia v nei na zhidkotekuchest' stali.** (Russian.) Iu. A. Nekhendzi and P. V. Sorokin. *Liteinoe Proizvodstvo*, 1954, no. 8, Nov., p. 17-20.

Experimental data and details of test equipment. Photograph, graphs, diagrams. 3 ref.

4133* Chlorine Treatment of Magnesium Alloys. **Khlorirovanie magnievykh splavov.** (Russian.) M. V. Sharov and B. S. Morozov. *Liteinoe Proizvodstvo*, 1954, no. 8, Nov., p. 20-22.

Effects of casting in Cl, A, and He atmospheres on porosity caused by adsorption of H. Tables, graph. 2 ref.

4134* Precision Casting and Its Application. **Genaugussverfahren und ihre Anwendung.** (German.) Th. Klingenstein. *Metall*, v. 8, nos. 23-24, Dec. 1954, p. 915-922.

Comparative discussion of the Croning, gypsum, Shaw, and lost-wax processes. Special advantages of the latter. Photographs, diagrams, tables. 8 ref.

4135* The Precision Foundry. **La fonderie de précision.** (French.) W. H. Sulzer. *Métallurgie et la construction mécanique*, v. 86, no. 11, Nov. 1954, p. 823 + 7 pages.

Describes lost wax process, materials used in precision foundry, construction principles, economic aspects. Photographs, diagrams, tables.

4136* The Riser-Gating Process; A Contribution to the Reduction of Scrap in Gray-Iron Foundries. **Das Steiger-Einguss-Verfahren, ein Beitrag zur Senkung des Ausschusses in den Graugussgiessereien.** (German.) Walter Ballhause. *Metallurgie und Giessereitechnik*, v. 4, no. 10, Oct. 1954, p. 439-445.

Principles and techniques for efficient foundry practice. Diagrams, tables, photographs. 2 ref.

4137* Possibilities of the Microfoundry in the Field of Miniaturizing in Radio-Electricity. **Les possibilités de la microfonderie dans le cadre de la miniaturisation en radio-électricité.** (French.) Pierre Lefranc. *Métaux, Corrosion-Industries*, v. 29, no. 350, Oct. 1954, p. 380-384.

Describes lost wax casting of miniature pieces. Photograph.

4138* Conditions for the Production of Nodular Cast Iron. **Gömbgrafitos öntvénygyártás bevezetésének feltételei.** (Hungarian.) Miklós Cseh. *Öntöde*, v. 5, no. 11, Nov. 1954, p. 241-251.

Outline of manufacturing processes of machine parts and other applications. Composition, heat treatment, mechanical properties. Diagrams, tables, graphs. (To be continued.)

4139* Conditions for Production of Nodular Cast Iron. **Gömbgrafitos öntvénygyártás bevezetésének feltételei. II.** (Hungarian.) Miklós Cseh. *Öntöde*, v. 5, no. 12, Dec. 1954, p. 265-270.

Casting properties; molding; use of FeSi instead of CaSi; addition of MgO. Tables, graphs. 59 ref.

4140* Design and Application of Risers of Steel Castings. **Acélöntvények felöntéseinek számítása és alkalmazása.** (Hungarian.) József Ferenczi. *Öntöde*, v. 5, no. 12, Dec. 1954, p. 282-285.

Problems of cylindrical and spherical risers. Diagrams, tables. 1 ref.

4141 Titanium Melting and Casting. D. I. Sinizer. *Precision Metal Molding*, v. 12, Dec. 1954, p. 36-37, 83.

Investment casting techniques for Ti and its alloys. Photographs.

4142 The Die Casting Process. *Precision Metal Molding*, v. 12, Dec. 1954, p. 50-55.

Description of process, advantages, metals that can be used, costs, and applications.

4143 Seal-Protect-Enhance With One Coating. E. J. Solski. *Precision Metal Molding*, v. 12, Dec. 1954, p. 59-61.

Vinyl plastic found to be highly satisfactory for Zn alloys with low Cu content. Photographs.

4144 Cast-Weld Construction of High-Alloy Steel Parts. G. J. Gibson. *Product Engineering*, v. 25, Dec. 1954, p. 178-183.

How to take advantage of welding to assure quality castings at minimum cost in the production of complicated designs. Photographs, diagrams, graph, table.

4145* Effect of Heat on the Durability of Die Casting Dies. **Vliv tepelného namáhání forem pro tlakové lití na jejich životnost.** (Czech.) Jiři Červášek. *Slévárenství*, v. 2, no. 8, Aug. 1954, p. 240-244.

Causes and elimination of thermal fatigue failures by surface treatment, particularly by nitriding. Diagrams. 1 ref.

4146* Use of Insulated Risers for Steel Castings. **Používání isolovaných nálitků u ocelových odlitků.** (Czech.) Vítězslav Batěk, Antonín Straka, and Jaroslav Kracík. *Slévárenství*, v. 2, no. 9, Sept. 1954, p. 267-270.

Advantages of flue dust in form of sleeves or powder over charcoal as insulating material. Diagrams, photographs.

4147* Analysis and Control of Foundry Operations Using Statistical Methods. **Rozbor a řízení výrobních podmínek ve slévárenství pomocí method matematické statistiky.** (Czech.) A. Žaludová. *Slévárenství*, v. 2, no. 10, Oct. 1954, p. 289-292.

Efficiency and operational value of technical control. Graph. 8 ref.

4148* Oxygen Enriched Blast for Cupolas. **Zkušenosti s přidáváním kysliku do kuplovny.** (Czech.) Miroslav Vilgus and Vlastislav Otáhal. *Slévárenství*, v. 2, no. 10, Oct. 1954, p. 292-296.

Efficiency of various degrees of enrichment; equipment and techniques. Diagrams, tables, graphs. 3 ref.

4149* Some Examples of Risering Steel Castings. **Několik příkladů úsporného nálitkování ocelových odlitků.** (Czech.) Houšť and Rostislav Slováček. *Slévárenství*, v. 2, no. 10, Oct. 1954, p. 296-301.

Advantages of blind atmospheric and insulated risers. Tables, diagrams, photographs, graph. 7 ref.

4150* Production of Austenitic Manganese Steel Castings. **výroba odlitků zaustenitické manganové oceli.** (Czech.) Karel Weber. *Slévárenství*, v. 2, no. 10, Oct. 1954, p. 301-305.

Casting characteristics; structures, mechanical properties; casting techniques. Table, micrographs, graphs, diagrams. 5 ref. ing techniques. Table, micrographs, graphs, diagrams. 5 ref.

4151* Use of Small Coke for Cupola of 1200 Mm. Diameter. **Použití drobného koksu v kuplovně o průměru 1200 mm.** (Czech.) Břetislav Sochor and Svatopluk Jouza. *Slévárenství*, v. 2, no. 11, Nov. 1954, p. 323-327.

Optimum size was found to be 1/10 to 1/15 of i.d. of the cupola. Graphs, diagrams, tables. 16 ref.

4152* Casting of Cutting Tools. **Odlévání řezných nástrojů.** (Czech.) Otakar Morávek. *Slévárenství*, v. 2, no. 11, Nov. 1954. p. 335-338.

Production techniques and advantages of cast milling cutters. Photographs.

4153* Coreless Low-Frequency Induction Furnace for Steel Production. **Nízkofrekvenční indukční pec bez jádra na**

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výrobu oceli. (Czech.) Emil Langer. *Slévárenství*, v. 2, no. 8; *Práce Československého Výzkumu Slévarenského*, v. 1, no. 10, Aug. 1954, p. 65-70.

Advantages and limitations of 50 cycle heating; comparisons with 1000 cycle operation. Diagrams, tables, graph. 4 ref.

4154* Gas and Oxide Contents of Cupola Melted Iron Castings and the Influence of Charged Materials. **Die Gas- und Oxydgehalte von Eisenguss aus dem Kupolofen und ihre Beeinflussung durch die Schmelzstoffe.** (German.) Peter Bardenheuer and Peter von der Forst. *Stahl und Eisen*, v. 74, no. 24, Nov. 18, 1954, p. 1577-1582.

Defects caused by gases; effects of various oxides in the melt on the Mg-S ratio; influence of solidification range on defects. Tables, graphs. 4 ref.

4155* The Oxygen Low-Shaft Furnace and Its Mode of Operation. **Der Sauerstoff-Niederschachtofen und seine Arbeitsweise.** (German.) Hans Erne. *Stahl und Eisen*, v. 74, no. 25, Dec. 2, 1954, p. 1644-1648.

Influence of variations in charged materials, type of fuel, and O content of blast on operating characteristics. Diagrams, graphs, tables. 7 ref.

4156 What Can You Do About Flaws? T. E. Eagan. *Steel*, v. 135, Dec. 6, 1954, p. 158-159, 162.

Detection, evaluation, and repair of defects in iron or steel castings; residual stresses and stress relief. Photograph, diagram, table.

4157* "Booking" Technique Extends Application of Frozen Mercury Process. *Tooling and Production*, v. 20, Dec. 1954, p. 96.

Utilization of the fact that frozen Hg joins with slight pressure.

4158* Soviets Pour Cast Iron Sheet Material in New Process. F. H. Baer. *Western Machinery and Steel World*, v. 45, Dec. 1954, p. 84-86.

Method of continuous casting between water-cooled rollers. Diagrams.

Books and Miscellaneous Publications

4159 Foundry Manual for Sand Casting Aluminum-10 Per Cent Magnesium Alloy. Battelle Memorial Institute. 118 p. 1954. Frankford Arsenal, Philadelphia. (TS555 B32f)

Techniques and precautions for producing sound castings. 34 ref.

See also:
4618 (smog control)

METALS—HEAT TREATMENT

4160* Sub-Zero Heat Treatment. E. H. Clark. *Australasian Engineer*, 1954, Oct., p. 121 + 5 pages.

Required hardness and quenching problems and how they were solved.

4161 Drip-Feed Gas Carburizing. *Automobile Engineer*, v. 44, Dec. 1954, p. 549-552.

Principles and advantages of the Wild-Barfield "Carbodrip" system for case-hardening ferrous alloys. Micrographs, photographs, diagram, graph, tables.

4162* Controlled Atmosphere for Annealing Thin Steel Sheet. **Ochranná atmosféra pro žíhání tenkých ocelových plechů.** (Czech.) Josef Teindl. *Hutnické Listy*, v. 9, no. 7, July 1954, p. 406-409.

Theory; equipment and process for use of producer gas. Graphs, diagrams, table. 10 ref.

4163* How We Heat Treat Special Fastenings. T. W. Harker. *Industrial Gas*, v. 33, Dec. 1954, p. 6-7, 19-20.

Clean annealing and heat treating of bolts and fastenings results in resistance to high temperatures and corrosion. Photographs, diagram, micrograph.

4164 Small Parts Hardened to Precise Limits in Sealed, Batch-Type Furnaces. W. G. Patton. *Iron Age*, v. 174, Dec. 2, 1954, p. 120-121.

Equipment and techniques. Photographs.

4165 Some British Heat Treatment Furnaces. J. Lomas. *Machinery Lloyd (Overseas Ed.)*, v. 26, Dec. 4, 1954, p. 99-102.

Pit-type preheating, gas carburizing, reheating, and electric heat-treating type furnaces, and heating elements are described.

4166 Continuous Annealing of Steel Strip—Controls for a High-Speed Line. H. C. Morrow. *Mechanical Engineering*, v. 76, Dec. 1954, p. 990-994.

Line cleans and anneals 30 tons of Sn plate per hr. Photographs.

4167* On the Heat Treatment of Age-Hardenable Copper-Nickel-Silicon Alloys. **Zur Wärmebehandlung der aushärtbaren Kupfer-Nickel-Silizium-Legierungen.** (German.) K. Dies. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 842-846.

Effect of temperature, time, and composition on mechanical and physical properties. Graphs, table. 3 ref.

4168* Heat Treatment of Flat Pieces. **Le traitement thermique de produits plats.** (French.) G. Daniélou. *Métallurgie et la construction mécanique*, v. 86, no. 10, Oct. 1954, p. 757, 759, 761.

Roller furnace for annealing tubes and bars; treatment of nonferrous metals; annealing of malleable cast iron, etc. Photographs, diagrams.

4169* Production of Cold-Rolled Dynamo Strip With Low Wattage Loss. **Die Erzeugung von kaltgewalztem Dynamoband mit niedrigen Wattverlusten.** (German.) Werner Kunze. *Metallurgie und Giessereitechnik*, v. 4, no. 10, Oct. 1954, p. 431-432; disc., p. 432-434.

Describes heat-treating and rolling practice. Photograph, graphs, table.

4170 Improvement of Case Hardened Parts by Controlling Internal Stresses. Jacques Pomey. *Metal Progress*, v. 67, Jan. 1955, p. 147-153.

Proper compressive stresses at and near the surface which raise the endurance limit by 40% can be put into a machine part by carbo-nitriding followed by heat treatment. Graphs, diagram, micrograph.

4171 New Heat Treating Equipment in Great Britain. Tom Bishop. *Metal Progress*, v. 67, Jan. 1955, p. 154-158.

Includes photographs, table.

4172* Heat Treating Inconels. T. A. Dickinson. *Metal Treating*, v. 5, Nov.-Dec. 1954, p. 4, 6.

Times and temperatures recommended for Inconel "W" and "X". Tables, photographs.

4173 Alcohol Makes a Furnace Atmosphere. Milo J. Stutzman. *Steel*, v. 136, Jan. 17, 1955, p. 94, 96.

Heating of isopropyl alcohol-water mixtures produces carburizing or protective atmospheres which are easy to control. Photographs.

See also:
4145 (nitriding of die casting dies)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

4174* Thermal Expansion of Alloy Al 24 ST. **Expansão térmica da liga Al 24 ST.** (Portuguese.) R. M. Otto Weinbaum. *ABM (Boletim da associação brasileira de metais)*, v. 10, no. 34, Jan. 1954, p. 5-10.

Measuring apparatus and test data. Diagrams, graphs.

4175 Energy Theorems and Structural Analysis. II. Applications to Thermal Stress Problems and St. Venant Torsion. J. H. Argyris and S. Kelsey. *Aircraft Engineering*, v. 26, Dec. 1954, p. 410-422.

A generalized discourse with applications on energy principles, temperature effects, and non-linear stress-strain relations. Graphs, tables, diagrams. 7 ref. (To be continued.)

4176* Electrical Conductivity of Aluminum. **Die elektrische Leitfähigkeit von Aluminium.** (German.) E. Nachtigall. *Aluminium*, v. 30, no. 12, Dec. 1954, p. 529-533.

Effect of amount and type of impurities, structure, and cold working. Graphs, table.

4177 Thermochemical Investigations of Alloys. O. J. Kleppa. *American Chemical Society, Journal*, v. 76, Dec. 5, 1954, p. 6028.

Silver-Sb, -Sn, -Cd, and -In alloys are studied in a high-temperature (to 500 C) calorimeter. Graph. 2 ref.

4178 Factors Influencing the Notch Fatigue Strength of N-155 Alloy at Elevated Temperatures. Walter S. Hyler and Ward F. Simmons. *American Society of Mechanical Engineers, Paper no.* 54-A-239, 1954, 29 p. (TJ1 Am35p)

Effects of stress raisers of various intensities; explanation of notch-bar strengthening.

4179 Factors Influencing the Notch-Rupture Strength of Heat-Resistant Alloys at Elevated Temperatures. R. L. Carlson, R. J. MacDonald, and Ward F. Simmons. *American Society of Mechanical Engineers, Paper no.* 54-A-240, 1954, 29 p. (TJ1 Am35p)

Stress-rupture data for notched and unnotched bars of S-816, Inconel "X" and Waspaloy from 1200 to 1600F. Evaluation of individual cases. Graphs, tables, diagrams, micrographs. 5 ref.

4180* American Brittle-Fracture Experiments and the Conclusions for Brittle-Fracture Testing. **Amerikanische Sprödbruchversuche und die Folgerungen für die Sprödbruchprüfung.** (German.) Karl Rühl. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 421-433.

Review of literature. Graphs, diagrams, tables. 44 ref.

4181* Metallurgical Considerations on the Question of Fracture. **Metallkundliche Betrachtungen zur Frage des Trennbruches.** (German.) Eduard Houdremont and Hans-Joachim Wiester. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 435-443; disc., p. 444-446.

Internal and external conditions as causes of metal fractures; methods of reducing susceptibility to fracture. Photograph, diagrams, graphs, micrographs. 37 ref.

4182* The Electrical Measurement of the Loss Number of Electrolytic Sheet Iron. **Die elektrische Messung der Verlustziffer von Elektroblechen. I.** Principles. **Grundlagen.** (German.) H. Poleck. *Archiv für technisches Messen*, 1954, no. 226, Nov., p. 253-256.

Causes of inductive distortion; formation of sinusoidal induction. Circuit diagrams, graphs. 8 ref.

4183* Some Observations on the Ductility of Ferritic Nodular Iron. G. N. J. Gilbert. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Dec. 1954, p. 470-472 + 2 plates.

Suggests that proof stress and elongation at max. load be used as criteria for evaluation instead of yield stress and total elongation. Table, photograph, graph.

4184 Determination of Thermal Conductivities at High Temperatures. K. S. Krishnan and S. C. Jain. *British Journal of Applied Physics*, v. 5, Dec. 1954, p. 426-430.

Observed temperature distribution along a metal filament especially heated in a vacuum serves as the basis of the determination. Measurements reported for Pt between 1300 and 1800 K. Graphs. 10 ref.

4185 Effects of Residual Stresses in Welded Structures. G. M. Boyd. *British Welding Journal*, v. 1, Dec. 1954, p. 560-566.

Stress behavior analyzed from tensile strength, fatigue, stress corrosion, brittle fracture, elastic stability, reaction stresses, and weld cracking. Diagrams, graphs, photograph. 21 ref.

4185a* Explosion Bulge Testing of Weldments. W. S. Pellini. *Bureau of Ships Journal*, v. 3, Dec. 1954, p. 8-13.

Test equipment, techniques, and evaluation of materials. Photographs, diagrams.

4186 The Effect of High Loading on the Kinetic Friction of Ice. C. D. Niven. *Canadian Journal of Physics*, v. 32, Dec. 1954, p. 782-789.

Results of tests with stainless steel, bakelite, and Teflon reveal that Amontons' law does not hold true at high loadings and that the friction of ice is related to pressure and adhesion. Graphs, diagram, photograph. 9 ref.

4187 Strain-Ageing and the Yield-Point Elongation of Low-Carbon Steels. H. P. Tardif. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 512, Dec. 1954, p. 797-803; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 499-505.

Activation energy of strain-aging; effects of microstresses on yield-point elongation; directional effects. Graphs. 10 ref.

4188 Carbon-Molybdenum Steel Steam Pipe After 100,000 Hours of Service. R. J. Sinnott, I. A. Rohrig, J. W. Freeman, and A. I. Rush. *Combustion*, v. 26, Dec. 1954, p. 45-51.

Evaluates design considerations and laboratory data in terms of creep in service. Tables, graphs, diagram. 5 ref.

4189* Electric Resistance at High Frequency and Low Temperatures of Thin Metallic Deposits. **Résistance électrique en haute fréquence et basses températures des dépôts métalliques minces.** (French.) Suzanne Offret and Boris Vodar. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1027-1029.

At H.F., the resistance is smaller and temperature coefficient higher, caused by intergranular capacities forming a short circuit. Graphs. 3 ref.

4190* Approximate General Solution of Equations of Plasticity for the Two Dimensional Case. **Solution générale approximative des équations de la plasticité pour le cas de deux dimensions.** (French.) Matthias Matschinski. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1348-1350.

Solutions are obtained by linearizing the Treska buckling condition. An example of corrugation under compression is considered.

4191* Optical Method of Measuring and Separation of Stresses in Plane Elasticity. **Méthode optique de mesure et séparation des contraintes en élasticité plane.** (French.) Paul Acloque. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1350-1352.

By using an oblique beam polarized at 45° from the plane of incidence, it is possible to obtain the separate values of stresses. Diagram.

4192* Convection by Thin Wires and Nature of the Metal-Gas Interface. **Sur la convection par les fils fins et la nature de l'interface métal-gaz.** (French.) Israël Epelboin and André Vapaille. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1363-1365.

For small dissipations of heat, the nature of the metal and surrounding gas strongly influences natural convection by thin wires. Graphs, table.

4193* The Nature of the Variations of Coercive Force During the Tempering of Quenched Low-Carbon Steel. **O prirode izmenenii koertsitivnoi sily pri otpuske zakalennoi malouglerodistoi stali.** (Russian.) I. A. Bil'dziukevich, Ia. M. Golovchiner, and G. V. Kurdiumov. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 385-387.

Martensitic mechanism of tranformation. Temperature of tempering. Graph. 15 ref.

4194* Theory of the Drop in Coercive Force During Low-Temperature Tempering of Quenched Low-Carbon Steel. **K. teorii padeniia koertsitivnoi sily pri nizkotemperaturnom otpuske zakalennoi malouglerodistoi stali.** (Russian.) N. S. Fastov. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 391-393.

Mathematical treatment. Redistribution of stresses. 4 ref.

4195* Internal Stresses of Electrolytic Deposits of Nickel and Their Porosity. **Vnutrenie napriazheniia elektroliticheskikh osadkov nikelia i ikh poristost'.** (Russian) A. T. Vagramian and Iu. S. Tsareva. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 807-809.

Influence of surface-active substances (naphthalene disulfonate and paracresol) and a.c. Graphs. 2 ref.

Metals—Mechanical and Physical Properties

4196* Measurement of Vapor Pressure of Solid Antimony by the Method of Tagged Atoms. **Izmerenie uprugosti para tverdoi sur'my metodom mechenykh atomov.** (Russian.) An. N. Nesmeianov and B. Z. Iofa. *Doklady Akademii Nauk SSSR*, v. 98, no. 6, Oct. 21, 1954, p. 993-995.

Apparatus and experimental data from 345 to 588 C, using Sb^{-124} as the tracer. Graph, diagrams, table. 7 ref.

4197* **Room-Temperature Ductile Chromium.** H. Johansen and G. Asai. *Electrochemical Society, Journal*, v. 101, Dec. 1954, p. 604-612.

Preparation and some mechanical properties. Techniques of making brittle Cr ductile by removal of surface layers. Photographs, micrographs, tables, graph. 17 ref.

4198* **Lateral-Longitudinal Strain Ratio for Plastic Strains.** T. F. W. Smith. *Engineer*, v. 198, Nov. 19, 1954, p. 692-693.

The variation of Poisson's ratio with strain and the effect of changes of vol. Graphs, table.

4199* **Stresses in Rectangular Plate Projections. I.** J. C. Chapman. *Engineer*, v. 198, Dec. 3, 1954, p. 762-765.

The relaxation method is used to derive displacements and stresses in plates having imposed displacements along one long edge, with respect to the structural behavior of ships' superstructures. Photograph, stress curves. (To be continued.)

4200* **Combined Tension and Torsion Machine for Relaxation Tests.** A. E. Johnson and N. E. Frost. *Engineer*, v. 198, Dec. 17, 1954, p. 834-835.

Creep testing under combinations of tension loads up to 600 lb. and torques up to 1000 in.-lb. over a temperature range of 20 to 800 C. Diagrams.

4201 **The Torsion Centre of Girders.** J. S. Terrington. *Engineering*, v. 178, Nov. 26, 1954, p. 688-691.

Application of shell analysis to structural sections and equations for determining the elastic stability of beams. Diagrams, table. 14 ref.

4202 **Diamond Indentors for Rockwell-Hardness Testing.** F. R. Tolmon and Joyce F. Hall. *Engineering*, v. 178, Dec. 10, 1954, p. 760-762.

Discussion of further developments in their precision measurement and an evaluation of their prescribed form. Micrographs, interferograms, diagrams. 1 ref.

4203 **Effects of Surface Treatment on the Strength and Endurance of Steels.** *Engineers' Digest*, v. 15, Nov. 1954, p. 466-468.

Methods and results of increasing strength of machine components by hardening surface layer or by introducing favorable stresses. Graphs, diagrams. 6 ref.

4204* Behavior of Metallic Cables Subjected to Tension. **Sur le comportement des cordes métalliques soumises à des forces de traction.** (French.) R. Goldschmidt. *Helvetica Physica Acta*, v. 27, no. 6, 1954, p. 508-512.

Describes apparatus which measures tension, elongation, and moment and angle of torsion simultaneously. Diagram, photograph.

4205* Cause of Embrittlement of Pt/Pt-Rh Thermocouples. **O jedné příčině zkřehnutí thermočlánku Pt/Pt-Rh.** (Czech.) František Králík. *Hutnické Listy*, v. 9, no. 8, Aug. 1954, p. 478-481.

Formation platinum silicide is principal cause. Refractograms, table. 10 ref.

4206* Examples of Intergranular Fracture of Steel. **Příklady mezikrystalických lomů ocelí.** (Czech.) Zdeněk Kadeřávek. *Hutnické Listy*, v. 9, no. 10, Oct. 1954, p. 578-593.

Theory of grain boundary conditions and fracture of C and alloy steels. Tables, graphs, micrographs. 25 ref.

4207* Examination of Mechanical Properties of Wrought Al-Zn6-Mg-Cu Alloy. **Studium mechanických vlastností tvářené slitiny Al-Zn 6-Mg-Cu.** (Czech.) Petr Skulari and Vladivoj Očenášek. *Hutnické Listy*, v. 9, no. 11, Nov. 1954, p. 655-666.

Test data for high and low temperatures. Structural changes during heat treatment. Tables, graphs, refractograms, diagram. 10 ref.

4208 **The Prevention of Cracking in Nickel Electrodeposits.** T. E. Such. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 13, v. 31, 1954, 17 p. + 2 plates. (TS670 E25j)

Determination of internal stresses and ductility for production control. Procedures for improving mechanical properties. Diagrams, graphs, photographs, tables. 17 ref.

4209 **The Surface Tension of Sodium.** J. W. Taylor. *Institute of Metals, Journal*, v. 83, Dec. 1954, p. 143-152.

Temperature coefficient from 98 to 450 C. Effects of oxide film. Diagrams, graphs, tables. 27 ref.

4210 **How to Control Hydrogen Embrittlement in 12 Chrome Steels.** A. E. Durkin. *Iron Age*, v. 174, Dec. 9, 1954, p. 154-156.

Effects of heat treatment and corrosion prevention on embrittlement. Graphs, table. 3 ref.

4211 **How Notch Sensitive Are Titanium Alloys?** F. R. Brotzen, E. L. Harmon, Jr., and A. R. Troiano. *Iron Age*, v. 174, Dec. 30, 1954, p. 52-55.

Effects of composition and heat treatment on properties of Ti-V alloys. Micrographs, diagram, graphs, tables.

4212 **Grain-Boundary Properties Effecting Cleavage Fracture.** J. Short and A. Muscott. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 368.

Mechanical analogy helps explain behavior of dislocations at grain boundaries. Diagram. 7 ref.

4213* Physical Properties of Forged Steel as Affected by Dendritic or Globular Ingot Structure. **Primärstruktur och stålkvalitet.** (Swedish.) A. Hultgren, K. O. Nordin, and B. Rinman. *Jernkontorets Annaler*, v. 138, no. 11, 1954, p. 702-730.

Influence of disturbed ingot solidification on mechanical properties of three steels in forged and heat-treated condition. Diagrams, tables, photographs, graphs.

4214 **Viscosity of the Sodium-Potassium System.** C. T. Ewing, J. A. Grand, and R. R. Miller. *Journal of Physical Chemistry*, v. 58, Dec. 1954, p. 1086-1088.

Studies extended to 700 C. Tables. 5 ref.

4215 **A Direct Reading Instrument for the Measurement of Small Displacements.** W. D. Corner and G. H. Hunt. *Journal of Scientific Instruments*, v. 31, Dec. 1954, p. 445-447.

Principle and operation of apparatus for measuring magnetostriction of small crystals of Ni with an accuracy of 1% and displacements to 10^{-7} cm. Diagram, graph, circuit diagram. 2 ref.

4216* Fatigue Limit of Aluminum Castings and of Their Welded Bonds, Exposed to Alternating Stress. **Váltakozó igénybevételeknek kitett alumíniumötvözetek és azok hegesztett kötéseinek kifáradási határa. II.** (Hungarian.) István Varga. *Kohászati Lapok*, v. 9, no. 11, Nov. 1954, p. 509-512.

Rotating bend tests on high strength alloys in various media. The welds investigated were made by argon-arc welding. Graphs, tables, photographs. 3 ref.

4217* Rheological Problems of Photoelasticity. **Rheologische Probleme der Spannungsoptik.** (German.) W. Feucht. *Kolloid-Zeitschrift*, v. 139, nos. 1-2, Nov. 1954, p. 17-37; disc., p. 37-38.

Importance of photoelastic testing to practical and theoretical research of strength problems, and its principles demonstrated on different types of material. Diagrams, photographs, graphs, table. 2 ref.

4218* Mechanism of Plastic Flow. **Zum Mechanismus des plastischen Fliessens.** (German.) J. Kubát. *Kolloid-Zeitschrift*, v. 139, nos. 1-2, Nov. 1954, p. 60-65; disc., p. 65-66.

Shows the independence of the time lapse of relaxations and

recoveries at constant elongation from the momentary external stress. A possible explanation is discussed. Graphs, diagram. 5 ref.

4219* Phenomenon of Brittleness in High-Strength Cast Iron. **lavlenie khrupkosti v vysokoprochnykh chugunakh.** (Russian.) N. G. Girshovich and M. P. Simanovskii. *Liteinoe Proizvodstvo*, 1954, no. 8, Nov., p. 12-14.

Effects of heat treatment and composition. Exact cause has not been determined. Table, graphs. 3 ref.

4220* Copper and Copper Alloys. **Koper en koperlegeringen. XIV.** Special Brass. **Speciaal messing.** (Dutch.) W. G. R. de Jager. *Metalen*, v. 9, no. 21, Nov. 15, 1954, p. 342-343.

Mechanical properties as a function of thickness. Diagram, graphs, table. 15 ref.

4221* Modulus of Elasticity and Yield Point of Copper and Copper Alloy Spring Sheet. **Elastizitätsmodul und Federungsgrenze von Federblechen aus Kupfer und Kupferlegierungen.** (German.) P. Melchior. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 850-852.

Correlation between tensile strength, modulus of elasticity and yield point. Graphs.

4222* Magnetic Anisotropy. **Magnetische Anisotropie.** (German.) H. Hesselbach. *Metall*, v. 8, nos. 23-24, Dec. 1954, p. 929-935.

Theory of anisotropy; production of Si-Fe and Ni-Fe alloys for electrical equipment. Diagrams, micrographs, graphs, tables. 6 ref.

4223* Temper Brittleness of Extra-Soft Iron-Chromium Ferritic Steels. **La fragilité de réchauffage des aciers extra-doux ferritiques fer-chrome.** (French.) H. Laplanche. *Métallurgie et la construction mécanique*, v. 86, no. 11, Nov. 1954, p. 837 + 8 pages.

Effects of embrittlement on mechanical, physical, and corrosion properties. Causes of embrittlement. Graphs, tables. 28 ref.

4224* Experiments on the Improvement of the Magnetic and Mechanical Properties of Transformer Sheets From Different Sources. **Versuche zur Verbesserung der magnetischen und mechanischen Eigenschaften von Transformatorenblechen verschiedener Schmelzherkunft.** (German.) Ernst Günther. *Metallurgie und Giessereitechnik*, v. 4, no. 10, Oct. 1954, p. 427-431.

Investigation of hot-rolled sheets from three mills; effect of composition on magnetic and mechanical properties. Graphs.

4225 Method of Determining Temperature Coefficient of Electronic Core Materials. R. H. Rodrian. *Metal Powder Association, Proceedings*, v. 2, 1954, p. 78-82; disc., p. 82-83. (TN695 M56p)

Techniques for determining thermal stability of H.F. components. Circuit diagrams.

4226 A Low-Alloy, Cr-Mo-Ti-B Steel for Use up to 1200° F. *Metal Progress*, v. 66, Dec. 1954, p. 84-89.

Boron-treated 3% Cr, 0.5% Mo, 0.5% Ti low-C steel has creep and stress-rupture properties superior to stabilized 18-8. Micrographs, graphs.

4227 Residual Stresses—How Dangerous Are They? Walter Soete. *Metal Progress*, v. 67, Jan. 1955, p. 108-113.

Includes diagrams.

4228* Elastic Hysteresis. Elastic Hysteresis and Internal Stresses. **Über die elastische Hysterese. Elastische Hysterese und innere Spannungen.** (German.) H. Frinken and E. Kappler. *Naturwissenschaften*, v. 41, no. 20, Oct. 1954, p. 472-473.

Correlation between elongation and stress on removing and reapplying a load on a plastically deformed bar; relationship of internal stresses to area of statically measured elastic hysteresis curve. Graphs. 4 ref.

4229* Spontaneous Hardening by the Frank-Read Source. **Eigenverfestigung der Frank-Read-Quelle.** (German.) Franz Eder and P. Täubert. *Naturwissenschaften*, v. 41, no. 20, Oct. 1954, p. 473-475.

Explanation of theory by dislocations, foreign atoms, and other irregularities in the lattice. Diagrams, graph. 4 ref.

4230 The Physical Nature of a Metal Surface in Conduction Theory. H. A. Müser. *Philosophical Magazine*, v. 45, 7th ser., no. 371, Dec. 1954, p. 1237-1246.

Attempts to identify a mechanism of electron diffraction which would lead to the conclusion that specular reflection is rendered impossible. Diagrams, graphs. 7 ref.

4231* Properties of Germanium Doped With Iron. I. Electrical Conductivity. W. W. Tyler and H. H. Woodbury. **II. Photoconductivity.** R. Newman and W. W. Tyler. *Physical Review*, v. 96, ser. 2, Nov. 15, 1954, p. 874-886.

Method of preparation and electrical properties of the crystals; measurements on the spectral dependency of impurity photoconduction which yield values of impurity ionization energies. Graphs, diagram. 19 ref.

4232 Resistivity and Hall Effect of Germanium at Low Temperatures. C. S. Hung and J. R. Gliessman. *Physical Review*, v. 96, ser. 2, Dec. 1, 1954, p. 1226-1236.

Investigates the activation of the impurity states, behavior of the degenerate electron gas, and the theory of scattering. Diagrams, graphs, tables. 20 ref.

4233 The Magnetic Properties and Their Temperature Dependence of Ferromagnetic Alloys With an Order-Disorder Transformation. I. Ni_3Fe. II. Ni_3Mn. (English.) Tadami Taoka and Taiichiro Ohtuska. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 712-729.

Change of magnetic properties at ordering temperatures. Test apparatus and technique. Tables, diagram, graphs. 40 ref.

4234 The Magnetostriction Constants of Silicon Steel. II. (English.) Hideo Takaki and Yoji Nakamura. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 748-752.

Kaya's law is confirmed for single crystals of 2.6, 3.2, and 4.0% Si steel. Tables, graphs. 9 ref.

4235 A Correlation of Metallurgical Hardness and Buffability. Harold Faint and R. Scott Modjeska. *Plating*, v. 41, Dec. 1954, p. 1422-1425; disc., p. 1426.

Tests fail to show a direct relationship of microhardness and buffing properties of Cu plated on mild steel. Photographs, micrographs, table. 9 ref.

4236* Ultimate Symmetry of Deformation Bands. **Konechnye simmetrichnye deformatsii polosy.** (Russian.) L. A. Tolokonnikov. *Prikladnaia Matematika i Mekhanika*, v. 18, no. 5, Sept.-Oct. 1954, p. 619-626.

Mathematical analysis. Diagrams, graph. 1 ref.

4237 Effects of Shock Loadings. W. M. Murray. *Product Engineering*, v. 25, Dec. 1954, p. 171-175.

Analysis shows that dynamic stresses are not always twice the static stress but depend on ratio of application rate to natural period. Graphs, oscillograms, tables, diagram.

4238 Thermal Conductivities of Solid Materials at High Temperatures. R. W. Powell. *Research*, v. 7, Dec. 1954, p. 492-501.

Review of relevant data for thermal conductivities of metals, alloys, and of other refractory materials. Tables, graphs. 53 ref.

4239* Thermal Expansion of γ-Extruded Uranium. **Étude dilatométrique de l'uranium filé.** (French.) Jean Bernard. *Revue de métallurgie*, v. 51, no. 11, Nov. 1954, p. 737-748.

Data for tests from room temperature to 900 C. Graphs, tables. 2 ref.

4240 The Electrical and Thermal Conductivities of Monovalent Metals. J. M. Ziman. *Royal Society, Proceedings*, v. 226, ser. A, Dec. 7, 1954, p. 436-454.

A recalculation of conductivities at all temperatures, with objections to and modifications of the Bloch theory. Treatment of electron scattering by thermal lattice vibrations. Graphs, diagram, table. 25 ref.

4241 Hardness Testing With the Vickers Machine. H. G. Harper. *Sheet Metal Industries*, v. 31, no. 332, Dec. 1954, p. 1001-1007.

Advantages, precautions, interpretation of data. Graphs, diagram, photographs, tables.

Metals—Mechanical and Physical Properties

4242* Magnetic Properties of Cast Steel. **Magnetické vlastnosti oceli na odlitky.** (Czech.) Vladimír Zedník. *Slévárenství*, v. 2, no. 7, July, 1954, p. 193-200.

Effects of composition of C and low alloy steels. Graphs, tables, diagrams.

4243* Magnetic Properties of Cast Steel. **Magnetické vlastnosti oceli na odlitky.** (Czech.) Vladimír Zednik. *Slévárenství*, v. 2, no. 8, Aug. 1954, p. 231-236.

Theoretical assumptions; effects of alloy additions and deoxidation practice on magnetic and mechanical properties. Tables, graphs, micrographs, photograph. 5 ref.

4244 Stress Concentration in the History of Strength of Materials. S. Timoshenko. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 1-12.

Review of theoretical and experimental work. Diagrams, graphs, photographs. 34 ref.

4245 Structural Analysis by Electrical Analogy. G. W. Riesz and B. J. Swain. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 13-32.

Use of equivalence between stored energy in a network of resistors and capacitors and strain energy in a structure to solve indeterminate problems. Circuits, photograph, graphs. 6 ref.

4246 Precise Investigation of Two Model Columns—Experimental Technique. J. R. Benjamin. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 23-26.

Study of simple elastic prismatic model columns. Photographs, graph, table.

4247 Stresses in Oval Tubes Under Internal Pressure. J. C. Weydert. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 39-54.

Analytic and experimental study. Table, graphs, fringe patterns, photographs. 10 ref.

4248 A New Cementable Material for Two- and Three-Dimensional Photoelastic Research. M. M. Frocht and Hui Pih. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 55-64.

Mechanical and optical properties of Castolite, a material suitable for stress freezing. Photographs, diagrams, fringe patterns, graphs, table. 6 ref.

4249 Applications of Experimental Stress Analysis to Torsion Research. C. E. Work and T. J. Dolan. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 79-90.

System of electrical, optical, and mechanical equipment to determine effects of temperature and strain rate on torsion of metals. Photographs, diagrams, table, graphs.

4250 A Method of Deriving Residual Stress Equations. J. W. Lambert. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 91-96.

Equations relating residual stress distribution to strains measured during removal of successive layers of material. Graphs. 5 ref.

4251 Photoelastic Stress Analysis for an Edge Crack in a Tensile Field. D. Post. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 99-116.

Experimental results are correlated with calculated data. Theory of advanced nucleation of fracture. Diagrams, fringe patterns, graphs, micrographs. 14 ref.

4252 A Piezoelectric Strain Gage. E. A. Ripperger. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 117-124.

Thin wafers of barium titanate are 500 times as sensitive as resistance wire gages and may be reused. Individual calibration is required. Diagram, circuits, graphs. 10 ref.

4253 Vehicle Vibration and Stress Testing. H. W. Larsen. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 125-134.

Techniques for experimental analysis of vibrations. Graphs, photographs.

4254 An Analysis of the Phenomenon of High Temperature Creep. O. D. Sherby and J. E. Dorn. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 139-154.

Review of creep phenomena; creep rates; mathematical model. Analysis of creep in Al. Graphs, reflectograms, micrographs. 43 ref.

4255 Metallurgical Aspects of Strength at Elevated Temperatures. G. V. Smith. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 155-162.

Effects of metallurgical variables and changes during service on properties. Graphs, micrographs. 16 ref.

4256 The Use of Photometric Devices in the Solution of the General Three-Dimensional Photoelastic Problem. M. M. Frocht, Hui Pih, and D. Landsberg. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 181-190.

Equipment and techniques; possible accuracy when combined with the shear-difference method. Diagram, photographs, fringe pattern, graphs. 11 ref.

4257 Residual Stresses in a Strip in Terms of Strain Changes During Electropolishing. D. O. Leeser and R. A. Daane. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 203-208.

Relatively simple accurate method of analysis. Diagrams, table. 3 ref.

4258 An Automatic Load Control for Fatigue Test Equipment. E. K. Benda and R. A. Gallant. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 209-214.

Equipment for use with a tuning fork type machine. Photograph, diagram, circuit diagrams, graph. 3 ref.

4259 Further Notes on Automatic Control as Applied to Fatigue Test Equipment. T. A. Hewson. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 1, 1954, p. 215-223.

Load controls for resonance and hydraulic test machines. Diagrams, photographs, graph.

4260 Titanium: No Time Limit on Toughness. W. L. Finlay, J. P. Catlin, and D. W. Kaufmann. *Steel*, v. 136, Jan. 17, 1955, p. 92-93.

Room temperature ductility of α Ti is not appreciably affected by combinations of time up to 1600 hr., temperatures up to 1000 F, and stresses to cause up to 10% elongation. Tables.

4261 What We Need to Know About Creep. John E. Dorn and Lawrence A. Shepard. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 3-28; disc., p. 28-30. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Methods of testing; isolation of effects of variables such as temperature, stress, and structural changes; problems needing further clarification. Graphs, refractograms, micrographs, table. 20 ref.

4262 The Problem of Thermal Stress Fatigue in Austenitic Steels at Elevated Temperatures. L. F. Coffin, Jr. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 31-50; disc., p. 51-52. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Mechanisms for strain localization; relationships between strain change and cycles to failure. Diagrams, graphs, photographs, tables. 11 ref.

4263 Effect of Temperature Cycling on the Rupture Strength of Some High-Temperature Alloys. James Miller. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 53-65; disc., p. 65-66. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Calculated and test data are correlated. Tables, graphs. 6 ref.

4264 Experiments on the Effects of Temperature and Load Changes on Creep Rupture of Steels. G. V. Smith and E. G. Houston. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 67-76; disc., p. 77-78. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Creep rate may be changed but generalized prediction cannot be made from present data. Tables, graphs. 9 ref.

4265 Effects of Cyclic Overloads on the Creep Rates and Rupture Life of Inconel at 1700 and 1800 F. R. H. Caughey and W. B. Hoyt. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 79-102; disc., p. 103-104. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Tests on coarse grained specimens showed reduced total life and elongation; creep rates were accelerated. Tables, micrographs, graphs.

4266 The Creep-Rupture Properties of Aircraft Sheet Alloys Subjected to Intermittent Load and Temperature. G. J. Guarnieri. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 105-146; disc., p. 147-148. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Test data for stainless steel, Inconel "X", N-155 alloy, and Ti, Al, and Mg alloys. Tables, diagram, graphs, micrographs, refractograms. 6 ref.

4267 Constant and Cyclic-Load Creep Tests of Several Materials. Ward F. Simmons and Howard C. Cross. Paper from SYMPOSIUM ON EFFECT OF CYCLIC HEATING AND STRESSING ON METALS AT ELEVATED TEMPERATURES. ASTM Special Technical Publication No. 165. p. 149-161. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5sc)

Data for 24S-T3 and 24S-T81 Al alloys and SAE 4130 and AISI 310 steels. Creep rates did not increase. Tables, graphs.

4268 Analysis of Brittle Behavior in Ship Plates. Morgan L. Williams. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 11-41; disc., p. 42-44. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Factors contributing to fracture on more than 130 plates. Relations between service experience, notch sensitivity, and chemical composition. Photographs, graphs, diagrams. 20 ref.

4269 A Critical Survey of Brittle Failure in Carbon Plate Steel Structures Other Than Ships. M. E. Shank. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 45-108; disc., p. 108-110. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Histories of various failures in industrial installations. Important factors in causes of brittle fracture. Photographs, diagrams, tables. 134 ref.

4270 Theory of Brittle Fracture and Criteria for Behavior at Low Temperatures. Earl R. Parker. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 116-130; disc., p. 131-132. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Treatment of factors leading to either cleavage or shear fractures. Test for determining relative brittleness. Photographs, graphs, micrographs, diagrams. 21 ref.

4271 Brittle Fracture. S. L. Hoyt. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 133-143; disc., p. 144-146. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Discussion of notch-bar testing and its use in appraising steels for critical service conditions. Graphs, tables. 11 ref.

4272 Metallurgical Aspects of Low-Temperature Behavior in Ferrous Materials. C. H. Lorig. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 147-162; disc., p. 163. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Effects of composition and manufacturing variables on sensitivity to embrittlement. Graphs. 40 ref.

4273 Fundamentals of Fractures in Metal. M. Gensamer. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 164-173; disc., p. 174-175. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Evaluation of effects of stress states on fracture behavior. Graphs, diagram. 4 ref.

4274 Effect of Metallurgical Structures on the Impact Properties of Steels. John A. Rinebolt. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 203-214; disc., p. 215. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Effects of micro-structures and composition on impact properties of five series of steels. Tables, micrographs, graphs. 6 ref.

4275 Reproducibility of Keyhole Charpy and Tear-Test Data on Laboratory Heats of Semikilled Steel. R. H. Frazier, J. W. Spretnak, and F. W. Boulger. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 286-303; disc., p. 304-307. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Analytical and mechanical tests on 18 heats showed good reproducibility on replicate heats. Keyhole Charpy and Navy tear-test specimens determined transition temperatures. Tables, diagram, graphs. 13 ref.

4276 Low-Temperature Impact Properties of Titanium. David E. Driscoll. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 326-330; disc., p. 331. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Test data for various alloys. Graphs.

4277 Notch Sensitivity of Steels. E. J. Ripling. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 365-372; disc., p. 373. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Portion of room-temperature notch brittleness due to transition behavior. Graphs, diagrams. 10 ref.

4278 Low-Temperature Toughness of Flake and Spheroidal Graphite Cast Iron. J. S. Vanick. Paper from SYMPOSIUM ON EFFECT OF TEMPERATURE ON THE BRITTLE BEHAVIOR OF METALS WITH PARTICULAR REFERENCE TO LOW TEMPERATURES. p. 405-412; disc., p. 413-414. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Effects of micro-structure and composition on properties down to −300 F. Tables, graphs, photograph. 2 ref.

4279* Avoiding Tool Failures With Negative Rake. Max Kronenberg. *Tool Engineer*, v. 34, Jan. 1955, p. 83-87.

Mathematical analysis of the actions of forces on cutting tools serves as an understanding to new application of coolants. Diagrams, graph, table. 3 ref.

Metals—Mechanical and Physical Properties

4280 Thermal Conductivity of Metals and Alloys at Low Temperatures. Robert L. Powell and William A. Blanpied. *U. S. National Bureau of Standards Circular* 556, Sept. 1954, 68 p. (TA460 P87t)

Compilaton and review of existing data covering nearly all metals. Tables, graphs. Approx. 200 ref.

4281* Methods and Results of the Investigation of the Bulk Elasticity of a Substance. **Metody i rezul'taty issledovaniia ob'emnoi uprugosti veshchestva.** (Russian.) M. Kornfel'd. *Uspekhi Fizicheskikh Nauk*, v. 54, no. 2, Oct. 1954, p. 315-342.

Equipment, techniques, theories. Diagrams, tables, graphs. 24 ref.

4282 Alloys and Their Properties for Elevated Temperature Service. Howard C. Cross and Ward F. Simmons. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 55-96. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

The significant developments since 1922. Areas which need further attention. Tables, graphs. 29 ref.

4283* Experiences With Long-Time Creep Tests on Heat-Resistant Steels. **Erfahrungen aus Zeitstandversuchen mit warmfesten Stählen.** (German.) H. Holdt. *VDI Zeitschrift des vereines deutscher Ingenieure*, v. 96, no. 32, Nov. 11, 1954, p. 1091-1098.

Experimental study of the creep resistance of high-temperature steels after 10,000 hr. and, by extrapolation, 100,000 hr.; data on the compositions, yield points, tensile strengths, fracture elongation, reduction of area, and notchimpact resistance. Graphs, tables. 8 ref.

4284 Root Conditions in a V-Notch Charpy Impact Specimen. H. A. Lequear and J. D. Lubahn. *Welding Journal*, v. 33, Dec. 1954, p. 585S-588S.

Tests on a geometrically similar specimen large enough to measure local strains. Photographs, diagrams, graphs. 3 ref.

4285 Residual Stress and the Compressive Strength of Steel. A. W. Huber and L. S. Beedle. *Welding Journal*, v. 33, Dec. 1954, p. 589S-614S.

Stress analysis of welded steel structures. Theories explain experimental behavior. Diagrams, graphs, tables, photographs. 19 ref.

4286 Stresses From Radial Loads in Cylindrical Pressure Vessels. P. P. Bijlaard. *Welding Journal*, v. 33, Dec. 1954, p. 615S-623S.

Design information for stresses caused by loads transmitted through attachments. Diagrams, graphs, tables. 4 ref.

4287 Fatigue Failure—Why It Occurs. R. Weck. *Welding and Metal Fabrication*, v. 22, Dec. 1954, p. 455-458, 477.

Shortcomings of designing for static strength requirements; effects of stress concentrations. Photographs.

4288 Prestressing Wires—Stress-Relaxation and Stress-Corrosion Up to Date. Gordon T. Spare. *Wire and Wire Products*, v. 29, Dec. 1954, p. 1421-1424, 1392-1493.

Properties of wire for use in prestressed concrete. Corrosion protection; embrittlement hazards. Diagram, micrographs, graphs.

4289* Investigations of the Dependence of Vickers Microhardness Upon the Load. **Untersuchungen über die Lastabhängigkeit der Vickers-Mikrohärte. I.** (German.) Helmut Bückle. *Zeitschrift für Metallkunde*, v. 45, no. 11, Nov. 1954, p. 623-632.

Experimental basis; existing hypotheses; sources of errors; the problem of the elastic spring effect. Table, graphs, micrographs. 36 ref.

4290* The Stress Functions of the Three-Dimensional Isotropic Elasticity Theory. **Die Spannungsfunktionen der dreidimensionalen isotropen Elastizitätstheorie.** (German.) Ekkehart Kröner. *Zeitschrift für Physik*, v. 139, no. 2, 1954, p. 175-188.

Treatment of the isotropic integration problem of elastostatics with the aid of the tensor of stress functions. 8 ref.

4291* The Theory of Electrical Resistance of Good Metallic Conductors. **Zur Theorie des elektrischen Widerstandes guter metallischer Leiter.** (German.) Claus-Adolf Busse and Fritz Sauter. *Zeitschrift für Physik*, v. 139, no. 4, 1954, p. 440-447.

Proposes a relationship between the electrical resistance and other physical characteristics of alkali metals by treating the vibrating ion lattices as elastic ion continuums. Tables. 4 ref.

4292* Surface Tension of Binary Metal Alloys Having Space-Centered and Face-Centered Structures. **Poverknostnoe natiazhenie binarnykh metallicheskikh splavov ob'emnotsentrirovannoi i granetsentrirovannoi struktur.** (Russian.) A. E. Glauberman and A. M. Muzychuk. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 9, Sept. 1954, p. 1615-1622.

New formulas for determination with the surface tension of corresponding alloys expressed by values of "effective charges" characterizing the components of the alloys. Diagrams. 4 ref.

4293* Theory of Surface Tension of Binary Metal Alloys. **Teoriia poverkhnostnogo natiazheniia binarnykh metallicheskikh splavov.** (Russian.) A. E. Glauberman. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 9, Sept. 1954, p. 1623-1627.

A new theory, based on the concept of the quasi-heterogeneity of metal atoms in alloys. Diagram. 7 ref.

4294* Thermodynamic Investigations at Low Temperatures. **Termodinamicheskie issledovaniia pri nizkikh temperaturakh. V.** Melting, Premelting and False Phase Transition of Mercury. **Plavlenie, predplavlenie i lozhnyi fazovyi perekhod rtuti.** (Russian.) V. N. Kostriukov and P. G. Strelkov. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 10, Oct. 1954, p. 1825-1830.

Thermal capacity of solid, liquid, and supercooled Hg. Premelting of Hg contaminated by Zn and Tl. Graphs, table. 11 ref.

4295* Temperature Dependence of Internal Friction of Aluminum and Copper. **Temperaturnaia zavisimost' vnutrennego treniia aliuminiia i medi.** (Russian.) V. S. Postnikov. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1599-1608.

Heat of activation of viscous flow at grain boundaries is the same as for self-diffusion. Mechanism of relaxation. Graphs. 22 ref.

4296* Influence of Carbon Content on the Hardness of Carbon Steels at High Temperatures. **Vliianie soderzhaniia ugleroda na tverdost' uglerodistykh stalei pri vysokikh temperaturakh.** (Russian.) M. G. Lozinskii and S. G. Fedotov. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1609-1612.

Ratio of hardness to ultimate strength at temperatures up to 860 C and C content up to 1.5%. Graphs. 19 ref.

4297* Theory of Elastic Deformation of a Polycrystalline Alloy. **Teoriia uprugikh deformatsii polikristallicheskogo splava.** (Russian.) A. V. Gur'ev. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1644-1659.

Formulas and experimental proof for C steels. Mechanical hysteresis. Diagrams, table, graphs. 10 ref.

4298* Improving the Magnetic Characteristics of Transformer Iron by Treating It Electrochemically. **Uluchshenie magnitnykh kharakteristik transformatornogo zheleza putem ego elektrokhimicheskoi obrabotki.** (Russian.) S. Ia. Grilikhes. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1786-1787.

Effect of thermoelectric treatment on magnetic penetrability and hysteresis losses. Decreasing cold-hardening of surface layer. 2 ref.

4299* Residual Stresses in Piston Pins Made of Steel 45 by Induction Surface Hardening. **Ob ostatochnykh napriazheniiakh v porshnevykh pal'tsakh, izgotovlennykh iz stali 45 pri poverkhnostnoi induktsionnoi zakalke.** (Russian.) S. E. Garf and V. A. Kukuevitskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1830-1833.

Microhardness; depth of tempered layer. Graphs. 5 ref.

Books and Miscellaneous Publications

4300 Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures. ASTM Special Technical Publication No. 165. 175 p. 1954. American Society for Testing Materials, Philadelphia. (TA460 AM35.5sc)

Eight papers on creep, rupture, and oxidation which are abstracted individually.

4301 Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference at Low Temperatures. ASTM Special Technical Publication No. 158, 474 p. 1954. American Society for Testing Materials, Philadelphia. (TA460 Am35.5se)

Includes 26 papers covering occurrence, theory, and control of brittle fracture of steels and cast iron.

See also:
3196 (stresses in structures)
3668 (failure of gas lines)
3730 (electropolishing and fatigue strength)
3744 (mechanical properties of Cu plated Al)
3822 (properties of Si transistors)
3978 (wear resistance of cast iron and cast steel)
4170 (internal stresses in case hardening)
4316 (effects of shot peening on properties)
4318 (embrittlement of Fe-Ni-Cr alloys)
4371 (hardness of electroplated Cr)
4384 (age hardening of Cu-Co-Mn alloy)
4401 (mechanical properties of Cr-Mo steels)
4434 (brittleness of cermets)
4439 (mechanical properties of cemented WC)
4444 (hardness testing)
4452 (absorption of electrons by Al)
4678 (brittleness of welded structures)
4683 (fatigue strength of welded rails)

METALS—MECHANICAL WORKING

4302 How Ryan Forms and Welds Titanium. *American Machinist*, v. 98, Dec. 6, 1954, p. 138-141.

Outlines methods for hot or cold forming and resistance- or fusion-welding. Photographs.

4303 Cope Talks on Draw Dies. XXII. Make Small Shells in Progressive Dies. Stanley R. Cope. *American Machinist*, v. 98, Dec. 20, 1954, p. 94-97.

Seven methods of drawing shells. Diagrams.

4304 Plastic Working of Metals. W. S. Wagner. *American Society of Mechanical Engineers, Paper no.* 54-A-64, 1954, 9 p. + 2 plates. (TJ1 Am35p)

Review of the art; effects of temperature, work hardening, deformation strength, and aging; relationships of stress-strain data and plastic working. Tables, graphs. 5 ref.

4305* Inert-Gas Forging. Carl L. Kolbe. *Electrochemical Society, Journal*, v. 101, Dec. 1954, p. 601-603.

Describes equipment in which materials can be worked at very high temperatures without gross oxidation. Diagrams, table.

4306* Operation of Soaking Pits. Their Regulation. **Marche des fours pits. Leur régulation.** (French.) M. Woll. *Flamme et Thermique*, v. 8, no. 73, Oct. 1954, p. 11-20, 29-34.

Installation and operation; remedies for present difficulties; thermal balance sheets. Diagram, charts, photographs, tables.

4307* Cutting Sheet Aluminum. E. V. Sharpnack, Sr. *Heating, Air Conditioning, Sheet Metal Contractor*, v. 46, Dec. 1954, p. 34-37.

Data and equation for computing shearing energy required for alloys in various tempers. Table, photographs.

4308* Calculation of Rolling Pressure. **Výpočet válcovacích tlaků.** (Czech.) Antonín Vach. *Hutnické Listy*, v. 9, no. 7, July 1954, p. 399-403.

Considers effects of yield strength, stress distributions, friction, work hardening, and other factors. Graphs. 7 ref.

4309 Some Factors Affecting the Quality of Extrusion. III. Christopher Smith and Norman Swindells. *Industrial Heating*, v. 21, Dec. 1954, p. 2446 + 6 pages.

Influence of temperature on extrusion of Cu and Al alloys. Table. (To be continued.)

4310 Sixty-Cycle Induction Heating of Large Steel Sections for Hot Forming. II. C. H. Hartwig. *Industrial Heating*, v. 21, Dec. 1954, p. 2522 + 5 pages.

Temperature, current, and power curves for heating ingots to rolling temperature. Graphs, tables, photograph. (To be continued.)

4311 The Fabrication of Chromium and Some Dilute Chromium-Base Alloys. F. Henderson, S. T. Quaass, and H. L. Wain. *Institute of Metals, Journal*, v. 83, Dec. 1954, p. 126-132 + 1 plate.

High purity Cr can be forged, swaged, and rolled. Alloys with up to 1% Ti and up to 5% W can be fabricated by the same methods. Tables, diagram, photographs, micrographs. 21 ref.

4312 The Role of Friction in Metal-Working Processes. Hugh Ford. *Institute of Petroleum, Journal*, v. 40, Oct. 1954, p. 291-294.

Examines coefficient of friction in the processes and compares typical values with those found in the usual slider tests. Possible mechanism of friction; requirements of lubricants. Diagrams, tables. 11 ref.

4313 Some Observations on Conditions of Lubrication in Wire-Drawing Dies. D. G. Christopherson, H. Naylor, and J. Wells. *Institute of Petroleum, Journal*, v. 40, Oct. 1954, p. 295-298.

Forced lubrication; drawing force, electrical resistance, and wire distortion observations. Photographs, diagrams, oscillographs. 6 ref.

4314 Some Lubrication Effects in Deep Drawing Operations. E. M. Loxley and P. Freeman. *Institute of Petroleum, Journal*, v. 40, Oct. 1954, p. 299-307.

The anomalous drawing properties of Al sheet; stretch-forming and cylindrical drawing of steel sheet; ironing of thin-walled metal cups. Tables, graphs, diagrams. 10 ref.

4315* Contribution to the Study of the Influence of the Preparation of Steel on the Fitness of Thin Sheets for Stamping. **Contribution à L'étude de l'influence de l'élaboration de l'acier sur l'aptitude des toles minces à l'emboutissage.** (French.) G. Husson, J. Stremsdoerfer, L. Beaujard, and J. Tordeux. *Institut de Recherches de la Sidérurgie, Publications*, ser. A, no. 81, Oct. 1954, 143 p. (TS300 In7p)

Influence of ingot practice, rolling, and heat treatment variations on forming characteristics and mechanical properties of steel sheet. Micrographs, tables, graphs, photographs, diagrams.

4316 Shot Peening Saves Weight, Improves Fatigue Life on Low Volume Parts. W. G. Patton. *Iron Age*, v. 174, Dec. 9, 1954, p. 152-153.

Techniques for and results of treating various parts. Photographs.

4317 Cold Forming Methods Save Materials, Lower Processing Costs. K. W. Stalker. *Iron Age*, v. 174, Dec. 23, 1954, p. 69-70.

Rolling against a mandrel produces accurately shaped parts with low scrap losses. Diagram.

4318 Why Stainless Is Hard to Cold Head. W. M. Baldwin, Jr. and C. A. Beiser. *Iron Age*, v. 175, Jan. 13, 1955, p. 82-85.

Effects of deformation rates on embrittlement of 12 Fe-Ni-Cr alloys. Photographs, graphs, diagrams.

4319 Increasing Rod Production by Conversion of a 2-Strand Roll Mill to 3-Strand Operation. C. H. Burden and W. E. Zelley. *Iron and Steel Engineer*, v. 31, Dec. 1954, p. 55-65; disc., p. 65-67.

Ingenious conversion program gave increased production economically with a minimum of disturbance to operations. Diagrams.

Metals—Mechanical Working

4320 Maintenance of Slag Bottom Soaking Pits. John A. Warchol, Jr. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 121-122; disc., p. 122-124.

Heating units; control of slag accumulation; slag removal.

4321 Metal Machining. W. Alfred Carter. *Machinery Lloyd (Overseas Ed.),* v. 26, Nov. 20, 1954, p. 70-84.

Factors affecting machining operations; application of photography to cutting tools; chip forming and flow; basic types of chip. Photographs, diagrams.

4322 Machining Forged Titanium 150A. *Machinery (London),* v. 85, Dec. 17, 1954, p. 1304-1311.

Measurements of drilling and cutting forces. Effects on tool life of shape, cutting speeds, feed rates, cutting lubricants, and coolants. Tables, photographs, graphs, diagrams.

4323* Cutting Force: Its Effect on Machine Design, Workpiece, Positioning, Maintenance. Horace A. Frommelt. *Machine and Tool Blue Book,* v. 49, Dec. 1954, p. 198-200 + 11 pages.

With workpieces designed to reduce cutting forces, processing costs will be reduced and better finishes will result. Photographs, diagrams.

4324* Heated Ingot Receptacles for Extrusion of Light and Non-Ferrous Metals. **Beheizte Blockaufnehmer zum Strangpressen von Leicht- und Buntmetallen.** (German.) H. M. Hiller. *Metall,* v. 8, nos. 23-24, Dec. 1954, p. 923-929.

Causes of defects; relationship between rate of extrusion and operation temperature. Graphs, tables. 6 ref.

4325 Induction Heating for Hot Forging—Induction Heat. Frank T. Chesnut. *Metal Progress,* v. 66, Dec. 1954, p. 91-94.

Advantages and applications of various types of induction heaters. Graphs, table.

4326 Dual-Frequency Heating for Hot Forging. Carl P. Bernhardt. *Metal Progress,* v. 66, Dec. 1954, p. 102-105.

Mass production of fairly heavy steel items favors L.F. for heating to the Curie Point, and H.F. for further heating to forging temperature. Photographs.

4327 Grinding Cemented Carbides. Arthur H. Allen. *Metal Progress,* v. 66, Dec. 1954, p. 115-119.

Electro-discharge, electrolytic, ultrasonic, and silicon carbide belt and wheel grinding circumvent the need for diamond wheels in tool dressing. Photograph, tables.

4328* Introduction to the Study of the Stamping Ability of Sheets. Internal Mechanics and Plasticity of Solids. **Introduction à l'étude de l'aptitude à l'emboutissage des tôles. Éléments de mécanique interne et de plasticité des solides.** (French.) Pierre Vauthier. *Métaux, Corrosion- Industries,* v. 29, no. 350, Oct. 1954, p. 361-371.

Plasticity of single crystals and polycrystalline materials, microcracks; criteria for various sheet metals. Diagrams.

4329* Corrections for Calculation of Elongation and Spread During Hot Rolling of Alloy Steels. **Ustalenie poprawek do obliczenia wydłużenia i roztłoczenia przy walcowaniu stali stopowych na gorąco.** (Polish.) Z. Wusatowski and E. Szostak. *Prace Instytutów Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 217-220.

Experimental data for 13 steels were used to refine Wusatowski's formulas. Graphs, table. 4 ref.

4330 Titanium Forgings. E. A. Fentzlaff. *Product Engineering,* v. 25, Dec. 1954, p. 129-132.

Development of special alloy and production forging techniques for shaping Ti parts for industrial uses. Tables, photograph, diagram.

4331* Contirbution to the Study of Oxygen Cutting. **Contribution à l'étude de l'oxycoupage.** (French.) Jean-Marie Morelle. *Revue de la soudure (Brussels),* v. 10, no. 3, 1954, p. 164-185.

Flow of slag in the cut; interrupted cutting; surface streaks; composition of slags; influence of temperature and pressure; conclusions. Tables, diagrams, graphs, micrographs. 21 ref.

4332* Specific Machinability Ratings for New Copper-Zinc Alloys. *Screw Machine Engineering,* v. 16, Dec. 1954, p. 50-51.

Ratings and approximate values to be used as a guide for correct tool shapes, speeds, and feeds. Advantages of new alloys. Tables.

4333 The Forming of Aluminium Sheet. IX. Blanking and Piercing. H. Hinxman. *Sheet Metal Industries,* v. 31, no. 332, Dec. 1954, p. 995-999.

Precautions for various sizes and conditions of the material. Photographs, tables, diagrams. (To be concluded.)

4334 The Rolling of Metals and Alloys. III. E. C. Larke. *Sheet Metal Industries,* v. 31, no. 332, Dec. 1954, p. 1033-1038.

Magnitude, causes, and control of thickness variations. Graphs, table. 5 ref. (To be continued.)

4335* Deep Drawing Test for Thin Strip. **Zur Tiefziehprüfung an dünnen Bändern.** (German.) Alfred Krisch. *Stahl und Eisen,* v. 74, no. 24, Nov. 18, 1954, p. 1591-1594.

Test for brass and steel from 0.10 to 0.40 mm. thick by 70 mm. wide. Effects of hold-down pressure. Formation of wrinkles. Tables, graphs, photographs. 4 ref.

4336* Problem of the Machinability of Stainless Steels. **K voprosu obrabatyvaemosti nerzhaveiushchikh stalei.** (Russian.) I. P. Efremov and I. G. Shneider. *Stanki i Instrument,* v. 25, no. 8, Aug. 1954, p. 13-15.

Evaluation for various machining and cutting operations for 13% Cr and 18, 8 types. Table.

4337 A Modern Perspective of the Grinding Process. H. R. Letner. *Steel Processing,* v. 40, Dec. 1954, p. 774-779, 798.

Theories; behavior of abrasives, chips, and work piece; effects of abrasive grinding. Diagrams, photographs, micrographs, graphs. 23 ref.

4338 Flame Cutting With Electronic and Magnetic Tracers. R. F. Helmkamp. *Steel Processing,* v. 40, Dec. 1954, p. 786-792.

Equipment and processes for guiding cutting torches. Photographs, diagrams.

4339* New Extrusion Techniques. E. J. de Ridder. *Tool Engineer,* v. 34, Jan. 1955, p. 69-74.

Extrusions as forging stock; new dies for hollow extrusions; combined extrusion-forging operation; tapered designs; new straightening methods; thin wall extrusions. Diagrams, photographs.

4340* How to Machine Titanium. H. Jack Siekmann. *Tool Engineer,* v. 34, Jan. 1955, p. 78-82.

Suggested recommendations by understanding its behavior and by selection of carbide grades. Graphs, tables, photographs.

4341 A Study of the Tangential and Normal Cutting Forces Produced When Machining Titanium. L. V. Colwell and R. M. Caddell. *U. S. Department of Commerce, Office of Technical Services,* PB 111479, July 1953, 7 p. + 24 plates. (T21 Un3r)

Factors influencing behavior of cutting forces; criteria determining most efficient machining practice for a given product or operation. Tables, graphs.

4342 Turning Titanium With Sintered Carbide Tools. L. V. Colwell. *U. S. Department of Commerce, Office of Technical Services,* PB 111480, June 1953, 5 p. + 24 plates. (T21 Un3r)

Combinations of carbide material and tool shape most satisfactory under representative commercial conditions. Graphs.

4343 Jets: From Blueprint to Engines. W. E. Jones and A. J. Rosenberg. Paper from UTILIZATION OF HEAT RESISTANT ALLOYS. p. 219-243. 1954. American Society for Metals, Cleveland. (TA473 Am35.5u)

Fabrication of C, low-alloy, and stainless steels, and super alloys. Graphs, photographs, micrographs. 2 ref.

4344* Hydromatic Drawing Process. **Das hydromatische Ziehverfahren.** (German.) M. Nickels. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 35, Dec. 11, 1954, p. 1165-1167.

Details and advantages of the Kranenberg drawing process, based on embedding the blank directly into the pressure liquid. Diagrams, photographs.

4345* New Method for Determining the Components of a Cutting Force in Turning. **Novyi metod opredeleniia sostavliaiushchikh sily rezaniia pri tochenii.** (Russian.) P. G. Terlikov. *Vestnik Mashinostroeniia*, v. 34, no. 11, Nov. 1954, p. 42-48.

Variables to be considered and measuring techniques. Tables, diagrams, photograph, graphs. 3 ref.

4346* **Slotting Operations.** John E. Hyler. *Western Machinery and Steel World*, v. 45, Dec. 1954, p. 72-74.

New developments and methods lower production costs. Photographs.

4347* **Mechanics of Tool Engineering. XVI. Techniques of Sheet Metal Fabrication.** Andrew E. Rylander. *Western Machinery and Steel World*, v. 45, Dec. 1954, p. 75-80.

Principles and various tools for sheet metal work. Photographs.

4348* **The Influence of Lubricants on the Drawing Force in Cold-Drawing Wire Rod.** Werner Lueg and Karl-Heinz Treptow. *Wire Industry*, v. 21, Dec. 1954, p. 1211 + 4 pages. (Condensed from *Stahl und Eisen*, v. 74, no. 21, Oct. 7, 1954, p. 1334-1352.)

Previously abstracted from original. See item 1135, v. 4, Jan. 1955.

4349 Continuous Wire Drawing and Packaging. William H. Richardson. *Wire and Wire Products*, v. 29, Dec. 1954, p. 1430-1433, 1482-1486.

Manufacturer and consumer both gained by adoption of unique packaging process. Photographs.

Books and Miscellaneous Publications

4350 Machine Tools for the Machining of Metals. **Werkzeugmaschinen Für Metallbearbeitung.** (German.) Karl P. Matthes. 100 p. 1954. Walter De Gruyter & Co., Berlin. (TJ1185 M43w)

Discusses the need for machine tools, life span of the machine, and the effect of the state of technical development. Treats the general basis of the machine tools, their historical development, properties, types and standards, and limits of precision.

See also:
3643 (forming of metal-plastic laminates)
3646 (phosphate coatings in cold-drawing of steel wire)
3983 (machining of austenitic steel)
3984 (soaps for wire drawing)
4128 (cast rolling mill rolls)
4152 (cast milling cutters)
4169 (rolling of dynamo steel)
4279 (analysis of cutting forces)
4432 (deep drawing of powdered metal blanks)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

4351* Magnetic Pattern Samples on Martensite. **Magnetische Pulvermuster auf Martensit.** (German.) Wilfried Andrä. *Annalen der Physik*, v. 15, no. 1, 1954, p. 31-34.

Application of magnetic field on martensitic steel reveals characteristic patterns. Micrographs. 6 ref.

4352* Effect of Surface Tension on the Formation of Graphite in Cast Iron. **Einfluss der Oberflächenspannung auf die Ausbildung des Graphits im Gusseisen.** (German.) Kurt Grütter and Borut Marinček. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 447-453.

Experiments show that shape of graphite depends on the surface tension. Table, micrographs. 14 ref.

4353* The Pearlite in Chromium Steel With 0.4% C and 3.5% Cr. **Der Perlit in einem Chromstahl mit 0,4% C und 3,5% Cr.** (German.) Angelica Schrader. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 465-474.

TTT studies on orientation and structure. TTT diagram, micrographs. 10 ref.

4354* Transformation Limits of the Iron-Nickel System in the Temperature Range Below 300 C. **Umwandlungsgrenzen im System Eisen—Nickel im Temperaturgebiet unter 300°.** (German.) Franz Lihl. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 475-478.

Review of the difficulties of determining the equilibrium diagram at low temperature; reduction of solid solutions of intermetallic compounds permits production of fine alloy powders; the amalgam process of producing Fe-Ni and other powders; X-rays as a means of establishing equilibria below 300 C. Graphs, table. 16 ref.

4355* Process of Formation of the Sigma Phase in Steel With 18% Cr, 2% Mo, and 10% Ni. **Vorgang der Bildung von Sigma-Phase in Stahl mit 18% Cr, 2% Mo und 10% Ni.** (German.) Franz Braumann and Hans Krächter. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 479-486; disc., p. 486-488.

Magnetic, microscopic, and X-ray study; effects of cold work on σ formation. Graphs, micrographs, diagram. 2 ref.

4356* Calorimetric Investigation of an Intermediate-Stage Transformation. **Kalorimetrische Untersuchung einer Zwischenstufenumwandlung.** (German.) Otto Krisement and Franz Wever. *Archiv für das Eisenhüttenwesen*, v. 25, nos. 9-10, Sept.-Oct. 1954, p. 489-498.

Study of isothermal decomposition of austenite of a steel with 1.2% C and 3.8% Mn at 280 to 460 C. Kinetics of transformation. Diagrams, graphs, micrograph. 19 ref.

4357 An Improved Method for the Taper Sectioning of Metallographic Specimens. L. E. Samuels. *Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Technical Note* 21, Apr. 1954, 6 p. (T177 A78.2t)

Method developed using a simple machining jig. Accurate method of measuring the taper ratio of finish-polished section. Photographs. 5 ref.

4358* Porosity Observed in the Kirkendall Effect. **Sur la porosité observée dans l'effet Kirdendall.** (French.) Jean Blin. *Comptes rendus*, v. 239, no. 20, Nov. 15, 1954, p. 1293-1295.

Investigates existence of cavities in the alloy containing the metal that diffuses the faster by studying the diffusion of X-rays where the cavities are in formation. Table, graph. 6 ref.

4359* Some Cases of Nonprovoked Polygonization of Industrial Alloys. **Sur quelques cas de polygonisation non provoquée d'alliages industriels.** (French.) Pierre-A. Jacquet and Adrienne-R. Weill. *Comptes rendus*, v. 239, no. 21, Nov. 22, 1954, p. 1384-1386.

Typical examples of polygonization in two cast Cu-base industiral alloys and a hot-forged, homogenized and aged Al alloy. Micrographs. 4 ref.

4360* Study of Martensitic Transformation in the Vicinity of the Ms Point. **Étude de la transformation martensitique au voisinage du points Ms.** (French.) Jean Philibert and Charles Crussard. *Comptes rendus*, v. 239, no. 22, Nov. 29, 1954, p. 1493-1495.

Transformation kinetics in the upper region of the Ar^{111} of a super hardened steel. Relationships between stablization and chain reactions (quasi-simultaneous formation of bundles of martensitic plates). Graphs. 2 ref.

4361* Mechanism of the Nucleation of the Annealing Graphite of Prehardened White Cast Irons. **Mécanisme de la germination du graphite de recuit des fontes blanches prétrempées.** (French.) Jacques Pomey, André Véragen, and Pierre Mathon. *Comptes rendus*, v. 239, no. 22, Nov. 29, 1954, p. 1495-1497.

Determination of hardening and isothermic tempering conditions leading to a high number of graphite nuclei. Differential thermomagnetic study of the nature of carbides resulting from hardening and their evolution by tempering. Table, graphs. 1 ref.

Metals—Metallography, Transformations, and Structures

4362* Problem of the Experimental Verification of the Theories of the Growth of Crystals. **K voprosu ob eksperimental'noi proverke teorii rosta kristallov.** (Russian.) Iu. A. Krishtal. *Doklady Akademii Nauk SSSR*, v. 98, no. 3, Sept. 21, 1954, p. 395-397.

Rate of growth of crystals of *o*-chlornitrobenzene in relation to supercooling. Graphs, table. 7 ref.

4363* Problem of the Mechanism of Artificial Aging of Aluminum Alloys. **K voprosu o mekhanizme iskusstvennogo stareniia aliuminievykh splavov.** (Russian.) V. M. Berezhiani. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 773-775.

Investigates the effects of time and temperature of aging on the hardness of Al-Cu and Al-Cu-Mg alloys. Graphs, table. 8 ref.

4364* Influence of Aluminum on the Magnitude of the Interatomic Bonds of Silver. **Vliianie aliuminiia na velichinu mezhduatomnykh sviazei serebra.** (Russian.) B. N. Finkel'shtein and A. I. Iamshchikova. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 781-782.

Experimental data for Ag-Al alloys varying from 2.3 to 100% Ag at temperatures from 490 to 700 C. Graph, tables. 6 ref.

4365* Continuous Solid Solutions of Metallic Compounds of FeCr and FeV. **Nepreryvnye tverdye rastvory metallicheskikh soedinenii FeCr i FeV.** (Russian.) I. I. Kornilov and N. M. Matveeva. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 787-790.

Experimental data on transition from α solid solutions in the ternary Fe-Cr-V system to σ solid solutions between FeCr and FeV compounds. Graphs. 9 ref.

4366* X-Ray Investigation of Interatomic Reaction in Ni Base Solid Solutions. **Rentgenograficheskoe issledovanie mezhatomnogo vzaimodeistviia v tverdykh rastvorakh na osnove nikelia.** (Russian.) G. V. Kurdiumov and N. T. Travina. *Doklady Akademii Nauk SSSR*, v. 99, no. 1, Nov. 1, 1954, p. 77-80.

Relation of strength of bonding forces in the crystal lattice and content of alloying elements. Tables, graphs. 5 ref.

4367* X-Ray Structural Investigation of Electrodeposits of Ag-Pd and Cu-Pd. **Rentgenostrukturnoe issledovanie dispersnykh osadkov Ag-Pd i Cu-Pd, poluchennykh elektrolizom.** (Russian.) Iu. D. Kondrashev and I. P. Tverdovskii. *Doklady Akademii Nauk SSSR*, v. 99, no. 1, Nov. 1, 1954, p. 109-111.

Variation of average dimensions of crystals and distortion of the lattice; formation of continuous series of solid solutions. Graphs. 7 ref.

4368 Topochemical Reactions on Electrodeposits. Artur Kutzelnigg. *Electroplating and Metal Finishing*, v. 7, Dec. 1954, p. 454-457.

Reactions in which the deposit is converted into an insoluble adherent reaction product, and those in which the deposit is dissolved leaving a non-metallic film exhibiting original structure. Micrographs, diagrams, graphs. 9 ref.

4369 Etch Primers. E. C. J. Marsh. *Electroplating and Metal Finishing*, v. 7, Dec. 1954, p. 466-468.

Chemistry and mechanism of action, with special reference to adhesion. Compares performance of single pack and two solution-type primers. Graphs, tables.

4370* TTT Diagrams on Cast Iron Contribute to the Understanding of the Mechanism of Isothermal Transformations. **TTT-Diagramme für Gusseisen tragen zum Verständnis des Mechanismus der isothermen Umwandlung bei.** (German.) A. de Sy. *Giesserei*, v. 41, no. 22, Oct. 28, 1954.

Method of determining S curves; evaluation of TTT diagrams; mechanism of isothermal transformation. Tables, photographs, graphs, micrographs.

4371 The Influence of Annealing on the Structure and Hardness of Electrodeposited Chromium. C. P. Brittain and G. C. Smith. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 10, v. 31, 1954, 7 p. + 2 plates. (TS670 E25j)

Grain size increased and hardness decreased with increase of annealing temperature from 450 to 700 C. Graphs, micrographs. 4 ref.

4372 The Diffusion of Chromium and Other Elements Into Non-Ferrous Metals. R. L. Samuel and N. A. Lockington. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 11, v. 31, 1954, 14 p. + 2 plates. (TS670 E25j)

Diffusion of Cr, Mo, and W into Ni and its alloys produces coatings with good corrosion resistance. Diagram, graphs, tables, micrographs. 7 ref.

4373 The Hot-Stage Microscope and Its Use With the Cine-Camera. S. G. Glover. *Institute of Metals, Journal*, v. 83; *Institute of Metals, Bulletin*, v. 2, Dec. 1954, p. 181-183.

Conditions governing use; observation of shear-type transformations; photographic techniques. Photograph, micrograph. 6 ref.

4374 Examination of Metallic Surfaces by Electron-Diffraction Methods. E. C. Williams. *Institute of Metals, Journal*, v. 83; *Institute of Metals, Bulletin*, v. 2, Dec. 1954, p. 183-185.

General principles; techniques for metallic surfaces; experiences with 99.8% pure Ag. Diffractograms. 2 ref.

4375 Electron-Optical Methods in Constitutional Metallurgy. J. W. Menter. *Institute of Metals, Journal*, v. 83; *Institute of Metals, Bulletin*, v. 2, Dec. 1954, p. 185-192.

Principles of various systems; advantages and applications. Diagrams, micrographs. 37 ref.

4376 Continuous-Cooling Transformations in Steels. G. Mayer. *Institute of Metals, Journal*, v. 83; *Institute of Metals, Bulletin*, v. 2, Dec. 1954, p. 197-200.

Special dilatometric technique for studying transformations at ordinary heat treating cooling rates. Diagram, graphs. 5 ref.

4377 The Graphitization of Steel at Subcritical Temperatures. R. H. Hickley and A. G. Quarrell. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 337-346 + 2 plates.

Effects of previous history, chemical composition, and nature of heating atmosphere on rate of graphite formation at 660 C for 15 steels. Tables, graphs, micrographs. 18 ref.

4378 Some Aspects of the $\alpha \rightarrow \gamma$ Transformation of High-Purity Iron. P. R. Pallister. *Iron and Steel Institute, Journal*, v. 178, Dec. 1954, p. 346-348.

Specific heat, thermal analysis, and thermal e.m.f. measurements show that minimum $\alpha \rightarrow \gamma$ and maximum $\alpha \rightarrow \gamma$ transformation temperatures are both close to 908.5C. Graphs. 9 ref.

4379* Method of Investigation of Phase Transformation in Non-Metallic Compounds (Ferrites), and in Metal Alloys. **O metode issledovaniia fazovykh prevrashchenii v nemetallicheskikh soedineniiakh (ferritakh) i metallicheskikh splavakh.** (Russian.) M. V. Dekhtiar, L. M. Dekhtiar, and T. A. Iurina. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia*, v. 18, no. 4, July-Aug. 1954, p. 502-510.

Instrumentation and procedure based on the principle of electrical resistance and magnetic permeability. Graphs, diagrams. 11 ref.

4380* Structure and Texture of Metallic Layers of Nickel Obtained by Evaporation and Determined With the Use of the Electron Microscope and Electron Diffraction. **Structure et texture des couches métalliques de nickel obtenues par évaporation et déterminées avec l'emploi du microscope électronique et de la diffraction des électrons.** (French.) W. M. H. Sachtler, G. Dorgelo, and W. van der Knaap. *Journal de chimie physique*, v. 51, no. 9, Sept. 1954, p. 491-495 + 4 plates; disc., p. 496.

The cause of orientation of a condensed Ni film and the crystallographic faces present on the surface of an oriented film. Diagrams, micrographs, tables. 12 ref.

4381 Evidence for Order in the Mn-Mo Sigma Phase. B. F. Decker, R. M. Waterstrat, and J. S. Kasper. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Dec. 1954, p. 1406-1407.

X-ray scattering factors and geometrical considerations indicate the σ phase is ordered. Tables.

4382* Studies on the Cubic State of Copper. **Studien über die Würfellage bei Kupfer.** (German.) W. Gruhl and J. Gumper. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 830-834.

Effect of multidirectional rolling and heat treating on the cubic structure of Cu of 97.6% purity. X-ray diagrams, micrographs, diagrams. 15 ref.

4383* Contributions to the Metallurgical Analysis of Several Copper Alloys. **Beiträge zur metallkundlichen Analyse einiger Kupferlegierungen.** (German.) W. F. B. Timpe and F. Pawlek. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 834-841.

Isolation of oxide inclusions in Sn and Al bronzes and in Cu and their study under the photomicroscope and the ultra microscope; chemical, X-ray, and electron microscopic analyses. Micrographs, graphs, table, diagram. 45 ref.

4384* Contribution to the Age-Hardenability and Recrystallization of Copper-Cobalt-Manganese Alloys. **Beitrag zur Aushärtbarkeit und Rekristallisation von Kupfer-Kobalt-Mangan-Legierungen.** (German.) K. L. Dreyer. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 847-849.

Effect of temperature and time on the hardness of 13 Cu alloys. Table, graphs. 3 ref.

4385* The Binary and Multiple Systems of the B Metals. The Quinary System Cd-Ge-In-Sn-Zn. **Beitrag zur Kenntnis der Zwei- und Mehrstoffsysteme der B-Metalle: Das quinäre System Kadmium-Germanium-Indium-Zinn-Zink.** (German.) H. Spengler. *Metall*, v. 8, nos. 23-24, Dec. 1954, p. 936-939.

Thermal and microscopic investigations. Melting equilibria in polythermal diagrams. Diagrams. 19 ref.

4386 Diffusion Between Electrodeposited Copper and Zinc Alloy Die Castings. C. W. Roberts. *Metallurgia*, v. 50, no. 301, Nov. 1954, p. 207-212.

Effects of surface condition, cleaning procedure, temperature, and time on blistering of Cr plated Zn alloys. Tables, micrographs, graphs. 3 ref.

4387* Transformation of Residual Austenite in Tool Steels by Sub-Zero Treatment. **Trasformazione dell'austenite residua negli acciai da utensili con trattamento sotto zero.** (Italian.) P. Lombardi and U. Marturano. *Metallurgia italiana*, v. 46, no. 9, Sept. 1954, p. 317-322.

Advantages gained by combined low temperature and drawing treatments. Data show no correlation between hardness and cutting capacity. Graphs, table. 11 ref.

4388* Precipitations in Plastically Deformed Solid Solutions. **Ausscheidungen in plastisch verformten Mischkristallen.** (German.) Hermann Schumann. *Metallurgie und Giessereitechnik*, v. 4, no. 11, Nov. 1954, p. 474-484.

Differences between precipitations from supersaturated nondeformed and deformed solid solution alloys. Theoretical considerations. Diagrams, graphs, tables, micrographs. 28 ref.

4389 Some Recent Work in Physical Metallurgy in Sweden. Erik Rudberg. *Metal Progress*, v. 67, Jan. 1955, p. 104-107.

Incompleted reactions in solid alloys including bainitic hardening of alloy steels, martensitic hardening of 18-8 stainless, and earliest stages of precipitation hardening in non-ferrous alloys. Photograph, micrographs.

4390* Precision Determination of the Lattice Constants of Silver by the Back-Reflection Method. **Über eine Präzisionsbestimmung der Gitterkonstanten von Silber nach dem Rückstrahlverfahren.** (German.) Gerhard Becherer and Rudolf Ifland. *Naturwissenschaften*, v. 41, no. 20, Oct. 1954, p. 471.

Brief report on above. 4 ref.

4391 Concentration Contours in Grain Boundary Diffusion. R. T. P. Whipple. *Philosophical Magazine*, v. 45, 7th ser., no. 371, Dec. 1954, p. 1225-1236.

Derivation of formulas for concentration in a poorly diffusing half space by a thin well-diffusing slab, at different times after the edge of the half space has suddenly been raised from zero to unit concentration. Graphs. 3 ref.

4392 Statistics of Two-Dimensional Lattices With Many Components. (English.) Taro Kihara, Yukio Midzuno, and Toshio Shizume. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 681-687.

Mathematical model for generalizing the Ising lattice. Diagrams, table, graph. 7 ref.

4393 On the Solid Solubility of Silver in Aluminium. (English.) Ken-ichi Hirano and Yutaka Takagi. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 730-735.

Determination by changes of specific heat and electrical resistance during heating. Graphs. 16 ref.

4394 The Crystallographic Aspect of the Mechanical Twinning in Metals. (English.) Hiroshi Kihô. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 739-747.

Crystallographic calculations show possible twinning planes in various metals. Tables, graphs. 15 ref.

4395* Properties of Metallic Phases as a Function of Number and Kind of Bonding Electrons. Niels Engel. *Powder Metallurgy Bulletin*, v. 7, Dec. 1954, p. 8-18.

Theory of metallic bonding with special reference to cermets. Graphs, table. 9 ref.

4396* The Preparation of Titanium Carbide Specimens for Microscopic Study. Ronald Silverman and Patricia Doshna Luscz. *Powder Metallurgy Bulletin*, v. 7, Dec. 1954, p. 25-28.

Technique for unbound specimens. Micrographs. 3 ref.

4397* A New Method of Interpreting Debye-Scherrer Patterns. **Recherche d'une méthode nouvelle de déchiffrement des diagrammes de Debye-Scherrer.** (French.) G.-A. Homès and J. Gouzou. *Revue de métallurgie*, v. 51, no. 11, Nov. 1954, p. 749-757.

Construction of the reciprocal lattice; calculations; advantages and limitations. Tables, diagrams. 27 ref.

4398* Contribution to the Study of Recrystallization of Uranium in the Alpha Phase. Typical Data Relating to the Recrystallization and Growth of Alpha Uranium Grains. **Contribution à l'étude de la recristallisation de l'uranium dans le domaine α. Données caractéristiques concernant la recristallisation et la croissance des grains d'uranium α.** (French.) M. Englander. *Revue de métallurgie*, v. 51, no. 11, Nov. 1954, p. 758-770.

Relation between evolution of average recrystallized grain size, cold work ratio, temperature, and annealing time. Micrographs, tables, refractograms, graphs. 7 ref.

4399* Study of the Kirkendall-Smigelskas Effect in Copper-Brass Couples in the Presence of Impurities. **Étude de l'effet Kirkendall-Smigelskas dans les couples cuivre-laiton en présence d'impuretés.** (French.) A. Accary. *Revue de métallurgie*, v. 51, no. 11, Nov. 1954, p. 771-772; disc., p. 773.

Effects of P additions suggest interaction of the impurity and the lattice vacancies. Graph, tables. 6 ref.

4400* Method of Differentiation of Cu_2O and Cu_2S on Copper Micrographs. **Méthode de différenciation de Cu_2O et Cu_2S sur les micrographies du cuivre.** (French.) L. A. Boschi, H. Destaillats, J. A. Sabato, J. M. Valls, and A. Varsavsky. *Revue de métallurgie*, v. 51, no. 11, Nov. 1954, p. 774-776.

Identification of inclusions in electropolished specimens. Micrographs.

4401* Study of the Effect of Tempering on the Microstructure and the Mechanical Properties of Chromium-Molybdenum Steels at Room and Elevated Temperatures. **Étude de l'influence du revenu sur la microstructure et les propriétés mécaniques à froid et à chaud d'aciers au chrome-molybdène.** (French.) A. Constant and G. Delbart. *Revue de métallurgie*, v. 51, no. 11, Nov. 1954, p. 777-794; disc., p. 794.

Changes due to various tempering temperatures are explained by a physico-chemical change and coalescence of carbides. Graphs, micrographs, tables. 10 ref.

Metals—Metallography, Transformations, and Structures

4402* **The Geometric Coalescence Mechanism in Grain Boundary Migration.** (English.) John P. Nielson. *Rudarsko-metalurški zbornik*, 1954, no. 2, p. 105-120.

Concept of geometrical coalescence as related to grain structure and recrystallization. Diagrams, graphs, micrograph. 9 ref.

4003* Effect of Various Factors on the Amount of Hydrogen in Aluminum-Silicon Alloys. **Vliv různých provozních činitelů na obsah vodíku ve slitinách hliník—křemík.** (Czech.) Max Klíma. *Slévárenství*, v. 2, no. 8; *Práce Československého Výzkumu Slévárenského*, v. 1, no. 8, Aug. 1954, p. 57-60.

Vacuum extraction method for evaluating gasification of Al alloys. Diagrams, photographs, tables, graphs.

4404* The Ce-La, La-Sb, and Ce-In Phase Diagrams. **Über die Zustandsbilder Cer-Lanthan, Lanthan-Antimon und Cer-Indium.** (German.) Rudolf Vogel and Helmut Klose. *Zeitschrift für Metallkunde*, v. 45, no. 11, Nov. 1954, p. 633-638.

Thermal and microscopic investigation. Lattice determination of the compound $CeIn_3$. Graphs, tables, micrographs. 8 ref.

4405* Structure and Properties of the Co-Ni-Mn Alloys. **Aufbau und Eigenschaften der Kobalt-Nickel-Mangan-Legierungen.** (German.) Werner Köster and Hans Rittner. *Zeitschrift für Metallkunde*, v. 45, no. 11, Nov. 1954, p. 639-642.

Shows that recrystallization is to be expected because of the NiMn phase. Graphs. 7 ref.

4406* Structural Investigations of Alloys Between B-Metals Lean in Valence Electrons. **Strukturunter-suchungen an einigen Valenzelektronen-armen Legierungen zwischen B-Metallen.** (German.) Konrad Schubert, Ulrich Rösler, Werner Mahler, Erhard Dörre, and Waldemar Schütt. *Zeitschrift für Metallkunde*, v. 45, no. 11, Nov. 1954, p. 643-647.

Measurements of lattice constants of In_2Sn, $InSn_4$, $CdSn_9$, CdHg, MgCd, and their interpretation. Tables, diagrams, graphs. 28 ref.

4407* Microscopic Investigation of Mutual Diffusion of Metals in Nonuniform Porous Bodies. **Mikroskopicheskoe issledovanie vzaimnoi diffuzii metallov v neodnorodnykh poristykh telakh.** (Russian.) Ia. E. Geguzin and Pek-En-Gin. *Zhurnal Teknicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1626-1630 + 3 plates.

Experimental data on Ni-Co, Co-Fe, Cu-Pt, and Co-Pt systems. Micrographs, tables. 8 ref.

4408* Aging of High Carbon Steel. **O starenii vysokouglerodistoi stali.** (Russian.) D. S. Kazarnovskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1636-1643.

Low sensitivity of 0.60% C steels to aging is explained by retarding of N diffusion by the C. Tables, graphs, micrographs. 10 ref.

4409* Graphitization in the Epsilon-Phase of the Nitrided Layer of High-Carbon Steels. **Grafitizatsiia v ε-faze azotirovannogo sloia vysokouglerodistoi stali.** (Russian.) A. N. Serov. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1798-1801.

Chemical composition of steels. Depth of layer of ε-phase and change in dimensions of cross-section. Hardness of layer. Graph, tables, micrographs. 2 ref.

4410* Diffusion in Interstitial Alloys. **O diffuzii v splavakh vnedreniia.** (Russian.) A. A. Smirnov. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1802-1811.

Formulas for determining average height of potential barriers for passage of interstitial atoms; coefficient of diffusion of interstitial atoms. Graphs, diagram. 5 ref.

4411* Transformations in Iron-Carbon Alloys During Heating by Electric Current. **Prevrashcheniia v splavakh zhelezo-uglerod pri nagreve elektricheskim tokom.** (Russian.) V. N. Gridnev. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1812-1822.

Effect of rate of heating on position of critical points. Graphs, micrographs. 3 ref.

4412* Structure of the Primary Grain of Alloyed Steels During High-Temperature Heating. **Struktura pervichnogo zerna legirovannykh stalei pri vysokotemperaturnom nagreve.** (Russian.) V. N. Svechnikov and B. A. Movchan. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1823-1829 + 2 plates.

Segregation of various elements. Effects on structure and mechanical properties. Micrographs. 15 ref.

4413* Distribution of Secondary Electrons of Magnesium and Beryllium Alloys According to Energy. **Raspredelenie po energiiam vtorichnykh elektronov magnievykh i berillievykh splavov.** (Russian.) V. N. Lepeshinskaia and V. M. Tumorin. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 1933-1941.

Presents data concerning the mechanism of secondary emission of activated alloys. Graphs. 6 ref.

4414* Temperature Conditions of Phase Transformations During Induction Heating of Steel. **Temperaturnye usloviia fazovykh prevrashchenii pri induktsionnom nagreve stali.** (Russian.) I. N. Kidin and M. G. Kogan. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 2011-2024.

Theoretical analysis of the kinetics of the process and the effect of pearlite-austenite phase transformations on such heating. Graphs, oscillogram. 16 ref.

4415* Etching Steel by Ionic Bombardment. **O travlenii stalei ionnoi bombardirovkoi.** (Russian.) I. N. Prilezhaeva, G. V. Spivak, and M. I. Malkina. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 2090-2096.

Applicability of ionic etching to various types of steel. Effects of varying the voltage, current density, etc. Micrographs. 9 ref.

Books and Miscellaneous Publications

4416 Introduction to the Investigation of Crystal Lattice by Means of X-Rays. **Einführung in die Untersuchung der Kristallgitter mit Röntgenstrahlen.** (German.) Friedrich Trey and Wilhelm Legat. 112 p. 1954. Springer-Verlag, Mölkerbastei 5, Austria. (QD945 T72e)

A handbook for technicians, as a preparation for scientific monographs. Discusses one-, two-, and three-dimensional lattices. An observation of the similarities as well as variations of the three lattice structures.

See also:

3733 (crystal growth in cathodic deposits)
3758 (diffusion plating of Cr on steel)
4125 (effects of deoxidation on structure of cast iron)
4207 (transformations in Al-Zn-Mg-Cu alloy)
4233 (order-disorder in ferromagnetic alloys)
4448 (nondestructive metallography)

METALS—POWDER

4417* Study of the Influence of the Shape of the Piece on the Sintering Behavior of Powdered Mixtures of Copper and Tin. **Estudo da influência da forma da peça sôbre o comportamento da sinterização de misturas de pós de cobre e estanho.** (Portuguese.) Vicente Chiaverini and Carlos de Revoredo Barros. *ABM (Boletim da associação brasileira de metais)*, v. 10, no. 34, Jan. 1954, p. 11-22.

Test methods and experimental data. Diagrams, tables. 3 ref.

4418* Industrial Use of Steel Powder. **O emprêgo industrial da granalha de aço.** (Portuguese.) Georges Smirnow. *ABM (Boletim da associação brasileira de metais)*, v. 10, no. 34, Jan. 1954, p. 43-55.

General review of applications; production equipment. Micrographs, graphs, tables.

4419* Aluminum Powder and Paste. **Aluminium-Pulver und -Paste.** (German and French.) W. Hess. *Aluminium Suisse*, v. 4, no. 6, Nov. 1954, p. 183-190.

General discussion of principal uses and production techniques. Photographs.

4420 A Phase Diagram for the System Ti-TiO_2 Constructed From Data in the Literature. R. C. DeVries and

Rustum Roy. *American Ceramic Society Bulletin*, v. 33, Dec. 1954, p. 370-372.

A possible phase diagram for the system Ti-TiO_2 is presented which summarizes various data in the literature. Diagram. 16 ref.

4421* Progress With Metal Powders and Powder Metallurgy. H. W. Greenwood. *Engineer*, v. 198, Dec. 3, 1954, p. 780-781.

Review of the advancements in the field over the past seven years.

4422* Contribution to the Pressing of Metal Powders. **Příspěvek k lisování kovových prášků.** (Czech.) Jiří Vacek. *Hutnické Listy*, v. 9, no. 8, Aug. 1954, p. 456-462.

Determination of pressure distributions in Cu, Co, and Mo briquettes. Tables, graphs, photographs. 12 ref.

4423* Sintered Materials of the System Tungsten-Cobalt for Contacts Produced by Infiltration. **Slinuté hmoty soustavy wolfram—měď na vypínací kontakty zhotovené napouštěním.** (Czech.) Julius Chmeliček. *Hutnické Listy*, v. 9, no. 10, Oct. 1954, p. 602-609.

Infiltration of a porous W skeleton by molten Cu. Effects of processing variables. Diagrams, tables, graphs, micrographs, photograph. 20 ref.

4424* Direct Carbidization of Tungsten Trioxide. **K otázce přímé karbidace kysličníku wolframového.** (Czech.) Curt Agte and Josef Hruška. *Hutnické Listy*, v. 9, no. 11, Nov. 1954, p. 642-646.

Economic importance and conditions for direct production of WC. Tables, graphs. 12 ref.

4425 Measurement of Lubricant Thickness on Powder-Metallurgy Dies. N. P. Pinto. *Lubrication Engineering*, v. 10, Nov.-Dec. 1954, p. 336-339.

Use of air gage to check lubrication of die bores produces readings accurate and reproducible with 0.00005 in. Also useful for analyzing causes of early die failure. Diagrams, graph. 1 ref.

4426 Friction and Lubrication in Powder Metallurgy. Henry H. Hausner and Irving Sheinhartz. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 6-26; disc., p. 26-27. (TN695 M56p)

Evaluation of friction and lubrication variables in the production of powder metal parts. Diagram, graphs, tables, photograph, micrographs. 26 ref.

4427 Lubrication Practices With Metal Powder Bearings. H. D. Krummell and J. R. Hicks. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 28-36; disc., p. 36-37. (TN695 M56p)

Practices for supplying lubricant to various types of bearings. Graph, tables, diagrams.

4428 Powder Metallurgy in the Automotive Industry. Joseph Geschelin. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 44-49; disc., p. 50. (TN695 M56p)

Compositions and processing variations for typical applications. Tables.

4429 Aircraft Applications for Powder Metallurgy. William H. Woodward. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 51-55; disc., p. 55. (TN695 M56p)

Savings possible by use of powdered metals in experimental and production parts for aircraft. Graphs, diagrams, tables.

4430 Powder Metallurgy Versus Other Precision Forming Methods. Mathias M. Check. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 56-58. (TN695 M56p)

Advantages of powder metallurgy for production of precision parts.

4431 The Manufacture of Sheet Metals From Metal Powder. W. D. Jones. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 60-65; disc., p. 66-67. (TN695 M56p)

Continuous powder fabrication methods and possible applications. Photographs.

4432 Semi-Formed Drawing Stock by Powder Metallurgy. Robert Steinitz and Frank I. Zaleski. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 72-76; disc., p. 76. (TN695 M56p)

Advantages and properties of preformed Fe powder compacts for deep drawing of cartridge cases. Photographs, tables.

4433 Permeability Tuning, an Electronic Application of Iron Powder Cores. David M. Hodgin. *Metal Powder Association, Proceedings*, v. 2, 1954, p. 84-88; disc., p. 88-89. (TN695 M56p)

Electronic design problems of significance to powder metal producers. Photographs, diagrams.

4434* Note on the Relationship Between Brittleness and Microstructure of Cermets. P. Schwarzkopf and W. Leszynski. *Powder Metallurgy Bulletin*, v. 7, Dec. 1954, p. 19-21.

Possibilities of producing a shock-resistant material. 2 ref.

4435* The Friability Test as a Method of Evaluating Sinter Cake. I. Sheinhartz and H. M. McCullough. *Powder Metallurgy Bulletin*, v. 7, Dec. 1954, p. 22-24.

Detection of chemical impurities and inclusions before final processing of metal powders. Table, graphs.

4436 Infiltration With Copper Extends Range of Usefulness of Powdered Iron Gears and Cams. *Precision Metal Molding*, v. 12, Dec. 1954, p. 41-42.

Copper infiltration increases strength and wear resistance. Photograph.

4437* Sintered Aluminum Powder. **Gesintertes Aluminiumpulver.** (German.) R. Irmann. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 10, Oct. 1954, p. 327-334.

Reasons why mechanical and physical properties of cold-compressed, sintered, and extruded Al powder and its alloys differ from pure Al and Al alloys. Diagrams, micrographs, tables, graphs, photographs. 27 ref. (for English digest see *Engineers' Digest*, v. 15, Dec. 1954, p. 514-516.)

4438 Copper Sidesteps the Crucible. John D. Shaw. *Steel*, v. 135, Dec. 20, 1954, p. 76-77.

Production of strip from powder recovered from Cu scrap using the roll bonding process. Diagram, photograph, table.

4439 Mechanical Properties at Room Temperature of Four Cermets of Tungsten Carbide With Cobalt Binder. Aldie E. Johnson, Jr. U. S. *National Advisory Committee for Aeronautics, Technical Note* 3309, Dec. 1954, 16 p. (TL570 Un3t)

Stress-strain data are presented for compression, tension, and shear loadings; density and hardness values. Graphs, table. photograph. 4 ref.

4440* Investigation of Sintering of Pressed Metallic Powders Subjected to Hydrostatic Pressure. **Issledovanie spekaniia spressovannykh metallicheskikh poroshkov pri nalichii vsestoronnego davleniia.** (Russian.) Ia. E. Geguzin and B. Ia. Sukharevskii. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1613-1621.

Effects of various pressures and temperatures on shrinkage and flow of Cu and Ni powders. Graphs. 9 ref.

See also:
4026 (standards for powdered Fe cores)
4354 (production of alloy powders)
4395 (metallic bonding in cermets)

MINING ENGINEERING

4441* Methods of Increasing the Capacity of Oil-Well Drilling Rigs. **Puti povysheniia ispol'zovaniia moshchnosti burovykh ustanovok.** (Russian.) K. G. Osipov. *Neftianoe Khoziaistvo*, v. 32, no. 10, Oct. 1954, p. 1-5.

Discusses Soviet drilling equipment, including pumps and types of drives. Comparison of performances. Tables, graphs. 2 ref.

4442* Investigation of Forces in Fracturing of Coal by Cutting. **Issledovanie usilii pri razrushenii uglia rezaniem.**

Mining Engineering

(Russian.) S. S. Nekrasov. *Ugol'*, 1954, no. 11, Nov., p. 18-24.

Relation of mechanical properties of coal to cutting forces. Dynamometer and other testing devices. Graphs, tables, diagrams, photograph.

4443 Well Packers, Their Applications in the Oil and Gas Industry of West Virginia. J. A. Crumley, R. H. Edele and D. H. Harnish, Jr. *West Virginia University Bulletin, (Engineering Experiment Station Technical Bulletin no.* 38,) July 1954, 50 p. (TA21 W52t)

Describes uses, advantages and types of packers. Photographs.

NONDESTRUCTIVE TESTING

4444 Magnetic Hardness-Testing. *Aircraft Production*, v. 16, Dec. 1954, p. 491-493.

Rapid method of inspecting ferrous parts based on magnetic remanence. Photographs, diagrams, circuit diagram, graph.

4445* Eddy-Current Process of Nondestructive Testing of Metals. **Wirbelstromverfahren zur zerstörungsfreien Werkstoffprüfung von Metallen.** (German.) F. Förster. *Aluminium*, v. 30, no. 12, Dec. 1954, p. 511-516.

Methods and equipment for determining the properties, compositions, defects, and thicknesses of metals; protective and insulating coatings. Diagrams, graphs, photographs, table. 29 ref.

4446* Limits of Observing Light-Metal Parts on the Luminescent Screen With X-Ray Illumination. **Über Grenzen der Leuchtschirmbetrachtung von Leichtmetallteilen im Röntgenlicht.** (German.) F. Ebert. *Aluminium*, v. 30, no. 12, Dec. 1954, p. 517-519.

Technical conditions for satisfactory X-ray inspection. Tables, graph, photographs. 2 ref.

4447 The Non-Destructive Testing of Sintered Brass Parts. Julian Rossnick. *Metal Powder Association, Proceedings*, v. 1, 1954, p. 39-41; disc., p. 42-43. (TN695 M56p)

Use of inductance bridge to determine crush strength of sintered parts. Photographs, diagrams, graph.

4448* Nondestructive Metallographic Examination. **Roncsolásmentes metallográfiai vizgálat.** (Hungarian.) István Mester and Erik Fuchs. *Öntöde*, v. 5, no. 10, Oct. 1954, p. 217-227.

Description of apparatus for electrolytic polishing, etching, and examination of microstructures of surfaces of finished or semi-finished parts. Diagrams, micrographs, photographs. 15 ref.

4449* Radiographic Inspection of Petroleum Pipe Lines. Harold Horland. *Pipe Line News*, v. 26, Dec. 1954, p. 39-43.

Merits of the method; selection of proper radiographic sources; weld inspection and control; costs. Photographs, tables. 2 ref.

4450* Nondestructive Testing of the Thickness of Non-Magnetic Coatings. **Nieniszczące pomiary grubości powłok niemagnetycznych.** (Polish.) A. Stryk. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 5, 1954, p. 221-234.

Instrument suitable for flat or curved surfaces. Diagrams, graphs, tables, photographs. 8 ref.

4451* Nondestructive Materials Testing. **Zerstörungsfreie Werkstückprüfung.** (German.) F. Rohner. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 11, Nov. 1954, p. 371-373.

Reviews progress in radiography, electric-induction, magnetic, and ultrasonic processes since 1948. 18 ref.

4452* The Absorption of Homogeneous Electrons in Aluminum. **Die Absorption homogener Elektronen in Aluminium.** (German.) G. Backenstoss. *Zeitschrift für Naturforschung*, v. 9a, no. 10, Oct. 1954, p. 886-890.

Explanation of the measured linear drop of no. of particles of homogeneous electrons passing through Al. Comparison of measured with linear curves permits determination of intensity relations of different electron components and of the agreement between theoretical and experimental results. Graphs, table. 16 ref.

See also:
4468 (high energy X-rays)

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

4453 *K*-Capture Spectroscopy. Iron-55 X-Ray Absorption Determination of Sulfur in Hydrocarbons. Harold K. Hughes and John W. Wilczewski. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1889-1893.

Iron-55 replaces X-ray tube. Detects S in range of 0.05 to 2.7%. Photographs, tables, graphs. 10 ref.

4454 A New Material and Techniques for the Fabrication and Measurement of Very Thin Films for Use in 4π-Counting. B. D. Pate and L. Yaffe. *Canadian Journal of Chemistry*, v. 33, Jan. 1955, p. 15-23.

Films of polyvinylchloride-acetate copolymer proved satisfactory. Table, graphs. 22 ref.

4455* Proper Mass of the Photon. **La masse propre du photon.** (French.) Asher Pressman. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1023-1025.

Solution of Maxwell equations with cosmological consideration shows that the equation of a group of electro-magnetic waves is identical to that of a photon whose mass is of the order of 10^{-65} g.

4456* Study of the Variation of the Effective Fission Section of Pu^{239} in the Thermal and Epithermal Domains. **Étude de la variation de section efficace de fission de ^{239}Pu dans le domaine thermique et épithermique.** (French.) Georges Vendryes, Pierre Hubert, and Jean-Michel Auclair. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1034-1036.

Use of a neutron diffraction spectrometer to compare the effective fission section of Pu^{239} with that of the reaction B^{10}(n, alpha) Li^{7}. Graph.

4457* Orbits in the High-Focus Cosmotron With Non-Linear Approximation. **Sur les orbites dans le cosmotron à focalisation forte à l'approximation non linéaire.** (French.) Augustin Blaquière. *Comptes rendus*, v. 239, no. 20, Nov. 15, 1954, p. 1285-1287.

Approximate solution of the Hill equation. Results are applied to a type of non-linear equation with periodic coefficients. 2 ref.

4458* On the Accumulative Effects Caused by Thermonuclear Explosions at the Surface of the Globe. **Sur les effets accumulatifs provoqués par les explosions thermonucléaires à la surface du globe.** (French.) Charles-Noël Martin. *Comptes rendus*, v. 239, no. 20, Nov. 15, 1954, p. 1287-1289.

Study of chemical, radioactive, and climatic accumulative effects. 2 ref.

4459* First Results Obtained With the One Million Volt Particle Accelerator Installed at Lyons. **Premiers résultats obtenus avec l'accélérateur de particules à 1 million de volts, installé à Lyon.** (French.) Jean Thibaud, Pierre Verzaux, and Raymond Salin. *Comptes rendus*, v. 239, no. 22, Nov. 29, 1954, p. 1483-1485.

Describes apparatus and operating results. Graphs, diagram.

4460* Prospects for Nuclear Power. What's the Score? J. L. Schanz. *Electric Light and Power*, v. 32, Dec. 15, 1954, p. 78-87.

A concise appraisal of a broad literature survey and of opinions of many prominent men close to the nuclear scene which followed the signing of the Atomic Energy Act of 1954. Diagrams, tables, graph, map.

4461* Scattering of Neutrons on Nitrogen^{14}. **Streuung von Neutronen an Stickstoff N^{14}.** (German.) David Speiser. *Helvetica Physica Acta*, v. 27, no. 5, 1954, p. 427-440.

Attempts to isolate individual resonances of the n-N^{14} system, and to determine their quantum numbers, total rotating impulse, and parity. Graphs. 7 ref.

4462* Calculating the Number of Events of a Certain Type Produced in a Given Volume of Nuclear Emulsion Starting With Counting of Traces. **Calcul du nombre d'événements d'un certain type produits dans un volume donné d'émulsion nucléaire à partir des dénombrements de traces.** (French.) M. Gailloud, Ch. Haenney, and R. Weill. *Helvetica Physica Acta*, v. 27, no. 5, 1954, p. 467-480.

Mathematical relationships which enable calculation; counting techniques with advantages and disadvantages of each. Drawings. 13 ref.

4463 Heavy Water. D. R. Augood. *Industrial Chemist and Chemical Manufacturer*, v. 30, Dec. 1954, p. 585-593.

Problems in design of the new D_2O plant in New Zealand. Diagrams, tables. 10 ref.

4464 Radiochemical Measurements of the Natural Fission Rate of Uranium. P. K. Kuroda and R. R. Edwards. *Journal of Chemical Physics*, v. 22, Nov. 1954, p. 1940.

Depicts growth of Y^{90}, decay of Sr^{89}, and decay of Y^{90}. Graph. 5 ref.

4465 Liquid-Metal-Cooled Reactors. C. R. Stahl. *Mechanical Engineering*, v. 76, Dec. 1954, p. 978-980.

Mechanical design and an analysis of some problems associated with the design. Diagrams.

4466 The New Atomic Energy Law—What It Means to Industry. Everett L. Hollis. *Mechanical Engineering*, v. 76, Dec. 1954. p. 995-998.

Provides private industry a bigger role in development and a greater degree of cooperation with other nations.

4467* Industrial Uses of Nuclear Energy. Stuart McLain. *Midwest Engineer*, v. 7, Dec. 1954, p. 3-5, 13-17.

Radioisotopes; stable isotopes; power reactors. Development of government and industrial programs. Table.

4468 Research in High-Energy X-Rays. *National Bureau of Standards, Technical News Bulletin*, v. 38, Dec. 1954, p. 173-179.

Instrument development in the range from 2 to 180 m.e.v. provides data for nuclear physics, medicine, and industry. Photographs, diagrams, graph, table. 1 ref.

4469* Total Cross Section of Li^6 for Neutrons. C. H. Johnson, H. B. Willard, and J. K. Bair. *Physical Review*, v. 96, ser. 2, Nov. 15, 1954, p. 985-988.

Neutron total cross section of Li^6 measured in order to study this state in Li^7 and to extend the level survey to higher energies. Graphs, tables. 24 ref.

4470 Diffusion Parameters of Thermal Neutrons in Water. G. von Dardel and N. G. Sjöstrand. *Physical Review*, v. 96, ser. 2, Dec. 1, 1954, p. 1245-1249.

Measurements of decay rate of the neutron flux as a means of determining the mean life for absorption, diffusion constant, and the related diffusion length for neutrons in the moderator. Graphs, diagram. 12 ref.

4471 Fluorine-Plus-Proton Reactions. R. W. Peterson, W. A. Fowler, and C. C. Lauritsen. *Physical Review*, v. 96, ser. 2, Dec. 1, 1954, p. 1250-1258.

Properties of certain energy levels in O^{16}, F^{19}, and Ne^{20} studied by observations on the α particles and inelastic protons from the bombardment of F by protons. Graphs, tables. 23 ref.

4472* Nuclear-Energy Study Course: Number 6. How Neutrons Behave as Bullets. Robert H. Shannon. *Power*, v. 99, Jan. 1955, p. 82-84.

Describes the effects of neutrons hitting nuclei of solid metals. Diagrams, table.

4473 Table of Total Beta-Disintegration Energies. R. W. King. *Reviews of Modern Physics*, v. 26, Oct. 1954, p. 327-401.

Compilation of all reasonably established β-decay data. 350 ref.

4474 Table of Alpha-Disintegration Energies of the Heavy Elements. Frank Asaro and I. Perlman. *Reviews of Modern Physics*, v. 26, Oct. 1954, p. 456-462.

88 ref.

4475* Basic Problems of the Use of Radioactive Radiations in Measuring Techniques. **Osnovnye voprosy primeneniia radioaktivnykh izluchenii v izmeritel'noe tekhnike.** (Russian.) N. I. Shteinbok. *Uspekhi Fizicheskikh Nauk*, v. 54, no. 2, Oct. 1954, p. 231-284.

Equipment, techniques, and theories. Tables, circuit diagrams, diagrams. 81 ref.

4476* Absorption Measurements on Secondary Electrons for the Determination of the Energy of γ-Rays. **Absorptionsmessungen an Sekundärelektronen zur Energiesbestimmung von γ-Strahlen.** (German.) G. Backenstoss and W. Gentner. *Zeitschrift für Naturforschung*, v. 9a, no. 10, Oct. 1954, p. 882-886.

Use of coincidence and anticoincidence; counting tubes for measuring the energy of secondary electrons with several γ-rays. Diagrams, graphs, table. 8 ref.

4477* The Transition Effect of the Nucleon Components in Lead and Carbon. **Zum Übergangseffekt der Nukleonenkomponente in Blei und Kohle.** (German.) K. H. Lindenberger and P. Meyer. *Zeitschrift für Physik*, v. 139, no. 4, 1954, p. 372-387.

Describes a double ionization chamber for measuring nuclear processes produced by cosmic radiation. Results of measurements. Tables, diagrams, graphs. 19 ref.

4478* Formation of Mesons During Peripheral Collision of Nucleons. **Obrazovanie mezonov pri periphericheskikh stolknoveniiakh nuklonov.** (Russian.) V. T. Khoziainov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 27, no. 4, Oct. 1954, p. 445-457.

Investigates the effect of formation of pseudo-scalar mesons with pseudo-vectorial bond, having a given angular moment. Graphs. 8 ref.

Books and Miscellaneous Publications

4479 Nuclear Engineering. Pt. III. F. J Van Antwerpen, editor. Chemical Engineering Progress Symposium Series, v. L. 274 p. 1954. American Institute of Chemical Engineers, New York. (QC776 Am35n)

Contains 37 papers by 61 workers which cover the first international congress on peacetime uses of atomic energy at the University of Michigan; includes U ore treatment to religious aspects of atomics.

See also:

3203 (tracers in biological studies)
3437 (radiation protection by chemicals)
3452 (tracers in biochemical studies)
3480 (use of radioactive iodine)
3511 (oxidation of Am)
3535 (separation of radioelements)
3539 (oxidation by α rays)
3732 (tracers in electrochemistry)
4196 (tracers in vapor pressure studies)
4534 (tracers in vapor pressure studies)
4598 (gel formation by high energy radiation)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

4480 Royal Commission on Patents. Alex E. MacRae. *Canadian Chemical Processing*, v. 38, Dec. 1954, p. 88-90.

Hopes for the Commission to reduce time and cost of litigation, and to define patentability. Diagrams.

4481 'Teach-How' and 'Know-How'. *Chemical Age*, v. 71, Dec. 4, 1954, p. 1179-1180.

A balanced appraisal of J. A. Campbell's article (*Chemical Education*, v. 31, 1954, p. 581.) on the superiority of British education. Concedes advantages of American 'bulk' methods.

4482 Shortages: Raw and "Human". *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 132, 134.

Fossil fuels have promise of replacement but human resources are critical.

Operations Research and Management Engineering

4483* Educational Ills. Hubert N. Alyea. *Chemist*, v. 31, Nov. 1954, p. 429-432.
Suggests some needed improvements in secondary scientific education.

4484 Financial Control. II. Depreciation. H. Crump. *Chemistry & Industry*, 1954, no. 49, Dec. 4, p. 1492-1493.
Defines aspects and control.

4485 The Place of the Research Department in General Management Structure. M. W. Perrin. *Chemistry & Industry*, 1954, no. 51, Dec. 18, p. 1546-1548.
Dependence, the research director, and economics of research.

4486* Th Human Relations of Computers and Automation. Fletcher Pratt. *Computers and Automation*, v. 3, Dec. 1954, p. 6-7.
Considers labor's views of and hostility to this next technological "revolution". Computers and small business.

4487* Fuel Economy in Materials Handling. R. Solt. *Engineer*, v. 198, Nov. 12, 1954, p. 661-662.
Surveys the common practices and gives comparative data on the use of fuel in transport and handling systems in the iron and steel industry. Tables, diagrams.

4488 Control of Cost of Research and Development Projects. H. J. Finison. *Institute of Radio Engineers, Transactions, Professional Group on Engineering Management*, PGEM-2, Nov. 1954, p. 1-15. (TK1 In6.6em)
Management of industrial research from the viewpoints of the project leader, research supervisor, and technical manager. Tables, graphs. 2 ref.

4489 Human Relations in Engineering Management. Melville Hopkins. *Institute of Radio Engineers, Transactions, Professional Group on Engineering Management*, PGEM-2, Nov. 1954, p. 16-27. (TK1 In6.6em)
Application of the motivation theory. 31 ref.

4490 A Synthetic Detergent: A Case Study for Appreciations in Chemistry. Stanley C. Bunce. *Journal of Chemical Education*, v. 32, Jan. 1955, p. 46-47.
Considerations in increasing laymen's scientific interest. Table. 4 ref.

4491 The British Non-Ferrous Metals Research Association. B. Fullman and E. C. Mantle. *Metal Progress*, v. 67, Jan. 1955, p. 93-97.
Typical of some 40 British research associations supported by industry with some government assistance is the Non-Ferrous Association with more than 600 member firms. In addition to the principal job of conducting fundamental and applied research, it provides a consulting service for solving specific problems and an information service, all free of charge to members. Photographs.

4492 High-Speed Handling of Business Data. Donald W. Holmes and W. L. Swager. *Monthly Business Review*, 1954, Dec., p. 12.
Emphasizes closer cooperation between the businessman and engineer in developing data-processing equipment and the ultimate advantages of such machines.

4493 Make Every Man a Safety Man. David P. Thornton, Jr. *Petroleum Processing*, v. 9, Dec. 1954, p. 1894-1899.
Program of the Dow Chemical Co., Texas Division. Graphs, photographs, tables.

4494 Mathematics Spots Hidden Profits. Nyles V. Reinfeld. *Steel*, v. 135, Dec. 13, 1954, p. 118-119.
More accurate scheduling of tube mill equipment produced large savings. Tables.

Books and Miscellaneous Publications

4495 The Application of Results of Research. Vera Connell, editor. 212 p. 1954. Butterworths Scientific Publications, London. (T177 C76a)
Various methods for making known the results of research and their immediate application; critical examination of the obstacles to be overcome. Methods employed throughout the Commonwealth and the U.S.A.

4496 America's Resources of Specialized Talent. Dael Wolfle. 332 p. 1954. Harper & Brothers, New York. (LC1059 W83a)
An analysis and appraisal of the scientific, business, and professional manpower available for government and industry.

4497 Conference on Operations Research in Production and Inventory Control, Proceedings. 108 p. 1954. Case Institute of Technology, Cleveland. (T58 C76.6p)
Twelve papers presented at the third annual conference in Jan. 1954.

4498 Symposium on Operations Research in Business and Industry. 185 p. 1954. Midwest Research Institute, Kansas City, Mo. (T58 Sy68p)
History, applications, tools, and use as a control.

4499 The Organisation of Applied Research in Europe, the United States and Canada. v. I. A Comparative Study. v. II. Applied Research in Europe. v. III. Applied Research in the United States and Canada. Report of Technical Assistance Missions Nos. 8-82-83. 384 p. 1954. The Organisation for European Economic Co-Operation, Paris. (T175 Or3o)
A detailed analysis of the progress and present status of applied research, and a summary of the Missions' impressions of the research establishments visited. Considers problems of personnel, funds, and state of organization and development work, together with recommendations.

See also:
4700 (wood research)

ORE AND MATERIALS BENEFICIATION

4500 The Gutehoffnungshutte Pan Sintering Process. *Blast Furnace and Steel Plant*, v. 42, Dec. 1954, p. 1420-1424.
Highly automatic equipment and its advantages for treating fine ores, roll scale, ore concentrates, and flue dust. Diagrams, photographs.

4501 Dry Grinding and Air Classification Equipment. Bertrand Robinson. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 512, Dec. 1954, p. 794-796.
Types of equipment currently available. Diagrams, photographs.

4502 Magnetic Beneficiation of Non-Metallic Minerals. R. J. Haskin. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 512, Dec. 1954, p. 819-821; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 521-523.
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4503 Coal Preparation—A Mineral Engineering Problem. Wm. T. Turrall. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 512, Dec. 1954, p. 822-824.
Problems in economical beneficiation of coal.

4504* The Role of the Electric Arc Furnace in Utilizing Some Strategic Off-Grade Ores. Lloyd H. Banning. *Electrochemical Society, Journal*, v. 101, Dec. 1954, p. 613-621.
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4505 Coal Preparation by Flotation. *Engineering*, v. 178, Dec. 10, 1954, p. 769-771.
Combination of heavy-medium and froth flotation processes employed by new British plant, which will handle in excess of 400 tons per hr. Photographs, diagrams.

4506* The Removal of Sulphur From Coke During Carbonization. (Japanese.) Tsunetaro Kato and Kenjiro Takeshita. *Fuel Society of Japan, Journal*, v. 33, no. 330, Oct. 1954, p. 531-536.
Significance and evaluation of NH_4Cl and alkali cyanide addi-

tions, and the mechanism of S removal by these additives. Tables, graph.

4507* Studies on Flotation of Alumina and Depression of Silica From Kashmir Bauxite. P. K. Deshpande and G. N. Bhat. *Indian Institute of Science, Journal,* v. 36, sec. A, Oct. 1954, p. 267-276 + 1 plate.

Results of flotation techniques for enriching low-grade bauxites with high percentages of SiO_2 and Fe_2O_3. Tables, graphs, diagram. 16 ref.

4508 Tantalum and Niobium. Separation of Liquid-Liquid Extraction. Joseph R. Werning and Kenneth B. Higbie. **Anhydrous Separation.** S. L. May, A. W. Henderson, and H. A. Johansen. **Ductile Tantalum by Kroll Process.** H. A. Johansen and S. L. May. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2491-2500.

Strong hydrochloric acid extraction of Ta from anhydrous pentachlorides in mixed ketones; enhanced by ferric chloride. Separation by selective chlorination of partially hydrolyzed chlorides for 99% purity; Mg reduction of Ta pentachloride and distillation of $MgCl_2$. Graphs, tables. 55 ref.

4509 Microorganisms in Leaching Sulfide Minerals. Loren C. Bryner, Jay V. Beck, Delmar B. Davis, and Dean G. Wilson. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2587-2592.

Shows that a sterile control is not effective; nutrient solution is evaluated. Tables, photograph, graphs. 12 ref.

4510 Blast Furnace Coke. *Industrial Heating,* v. 21, Dec. 1954, p. 2463-2464, 2466, 2468.

Preparation of metallurgical grade; hot water quenching; pressure-test oven.

4511 Silver Bay Plant Will Pelletize Taconite Concentrates. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 141-142, 144, 147.

Equipment specified for new concentration plant. Diagrams, photographs.

4512 Developments in the Carbonate Processing of Uranium Ores. F. A. Forward and J. Halpern. *Journal of Metals,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954, p. 1408-1414.

Production of high grade U_3O_8 from leach solutions. Variables affecting operations. Tables, graphs. 14 ref.

4513* The Decomposition of Aluminate Liquor in the Presence of Red Mud. Investigation Methods and Factors Affecting the Accuracy. **Az aluminátlúg bomlása vörösiszap jelenlétében. Vizsgálati módszerek és a meghatározás pontosságát befolyásoló tényezők.** (Hungarian.) Béla Lányi. *Kohászati Lapok,* v. 9, no. 12, Dec. 1954, p. 541-551.

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4514* Testing Sinter Quality. **Ein Testversuch zur Prüfung der Sinterqualität.** (German.) Wolfgang Küntscher and Joachim Holzhey. *Metallurgie und Giessereitechnik,* v. 4, no. 10, Oct. 1954, p. 435-439.

Tests for controlling the operation of Fe ore sintering plants. Diagram, photograph, graph, table. 13 ref.

4515* Chemical and Physical Processes in the Direct-Process Revolving Tubular Furnace. **Die chemisch-physikalischen Vorgänge im Renn-Drehrohrofen.** (German.) Horst Weidermann. *Metallurgie und Giessereitechnik,* v. 4, no. 11, Nov. 1954, p. 462-468.

Processes in the preheating and reduction zones during sintering of Fe ore. Diagrams, graphs, photographs, table. 4 ref.

4516* Magnetic Separators With Permanent Magnets for Dry Dressing of Finely Dispersed, Strongly Magnetic Iron Ores. **Magnetscheider mit Dauermagneten zur trockenen Aufbereitung feinverteilter starkmagnetischer Eisenerze.** (German.) Erkki Laurila. *Stahl und Eisen,* v. 74, no. 25, Dec. 2, 1954, p. 1659-1661.

Behavior of magnetic powders in a moving multipolar field; design of separator. Diagrams, photograph. 4 ref.

4517* Economic Effectiveness of Enriching Coal for Coking. **Ekonomicheskaia effektivnost obogashcheniia uglei dlia koksovaniia.** (Russian.) L. I. Ulitskii. *Ugol',* 1954, no. 11, Nov., p. 33-36.

Lowering of ash content and its economic relation to ferrous metallurgy. Tables.

4518 Laboratory Recovery of Manganese Carbonate From the Martin Mine, Independence County, Ark. M. M. Fine and D. W. Frommer. *U. S. Bureau of Mines, Report of Investigations* 5086, Nov. 1954, 10 p. (TN21 Un3r)

Two procedures for the preconcentration of ore for flotation in the recovery of ferrograde Mn products. Tables. 5 ref.

4519 Treatment Tests of Scheelite Ores From California, Nevada, and Utah. A. L. Engel and E. S. Shedd. *U. S. Bureau of Mines, Report of Investigations* 5087, Nov. 1954, 24 p. (TN21 Un3r)

Compilation of results of preliminary tests as an aid in developing domestic W resources by establishing satisfactory treatment methods suitable for small-scale operations. Tables. 1 ref.

4520 Beneficiation of Scheelite Ore From the Sangdong Mine, Korea. P. H. Floyd and F. W. Wessel. *U. S. Bureau of Mines, Report of Investigations* 5088, Nov. 1954, 13 p. (TN21 Un3r)

Justification of a combined gravity, flotation, and magnetic-separation procedure for W and Bi concentrates from the ore. Tables, flowsheets. 3 ref.

See also:
3297 (enriching of quartz sand)
3352 (determination of Fe in ores)
3903 (identification of phases in ores)
3904 (enriching Indian Mn ore)
4015 (beneficiation of ferrous ores)

PHYSICS

4521* A Study of the Infrared Spectra of Some Stereoisomeric Diphenylpolyenes. (English.) K. Lunde and L. Zechmeister. *Acta Chemica Scandinavica,* v. 8, no. 8, 1954, p. 1421-1432.

Cis-trans relationships of 24 compounds $C_6H_5-(CH=CH)_n-C_6H_5$ from n = 1 to 4 studied. Table, infra-red spectrograms. 19 ref.

4522 Structures and π-Electron Spectra. II. The Transformation Matrix. III. Triphenylmethane Dyes. William T. Simpson and Catherine Worsfold Looney. *American Chemical Society, Journal,* v. 76, Dec. 20, 1954, p. 6285-6300.

Theoretical. Tables, diagram. 15 ref.

4523 Nuclear Magnetism. Felix Bloch. *American Scientist,* v. 43, Jan. 1955, p. 48-62.

Basic features; magnetic moments; resonance; internal chemical shift of electrons. Diagrams, photograph. 6 ref.

4524* Computation of Electron Interferences on Twin Crystals. **Zur Berechnung von Elektroneninterferenzen an Zwillingskristallen.** (German.) Heribert Jahrreiss. *Annalen der Physik,* v. 15, no. 1, 1954, p. 21-30.

Investigation of the importance of electron-optical phase relations between the components of a twin crystal to the computation of a refraction diagram. Method and results are shown to be applicable to other lattice configurations. Diagrams, graphs. 15 ref.

4525 The Propagation of an Electromagnetic Wave Along an Infinite Corrugated Surface. R. A. Hurd. *Canadian Journal of Physics,* v. 32, Dec. 1954, p. 727-734.

Procedure, based on the calculus of residues, yields expressions for the amplitudes and phase velocities which are accurate near cutoff when the no. of slots per wave length is about five or greater. Graphs. 8 ref.

Physics

4526 Calculated Diffraction Patterns of Dielectric Rods at Centimetric Wavelengths. Charlotte Froese and James R. Wait. *Canadian Journal of Physics*, v. 32, Dec. 1954, p. 775-781.

Reasonably good results obtained for diffraction patterns calculated for a cylindrical electromagnetic wave incident normally on a dielectric cylinder of infinite length. Diffraction patterns, diagram. 7 ref.

4527 Calculation of Depolarization Factors in the Raman Spectra of Polyatomic Molecules. Salvador M. Ferigle and Alfons Weber. *Canadian Journal of Physics*, v. 32, Dec. 1954, p. 799-807.

General expressions for the derived polarizability tensor are deduced for non-cyclic molecules having bends with cylindrical symmetry. Diagrams, tables. 10 ref.

4528 Nature of Wall Heat Transfer Coefficient in Packed Beds. Thomas J. Hanrattry. *Chemical Engineering Science*, v. 3, Nov. 1954, p. 209-214.

Equation derived from three basic considerations. Graphs, table. 6 ref.

4529 Nuclear Magnetic Resonance Spectra and the Structure of Infusible White Precipitate. C. M. Deeley and R. E. Richards. *Chemical Society, Journal*, 1954, Nov., p. 3697-3702.

Proton spectra of precipitate formed by three different methods. Spectra. 26 ref.

4530* Study of the Maximum Rate Attained at Rupture by Quartz Whose Sinusoidal Oscillation Does not Deform the Vibrating Surface. **Étude de la vitesse maximum atteinte à la rupture par un quartz dont l'oscillation sinusoïdale ne déforme pas la surface vibrante.** (French.) Norbert Ségard and Étienne Besème. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1021-1023.

Vibration of quartz crystals. 4 ref.

4531* Research on Stimulating the Phosphorescence of Calcium Oxide. **Recherches sur la stimulation de la phosphorescence de l'oxyde de calcium.** (French.) Albert Crozet and Joseph Janin. *Comptes rendus*, v. 239, no. 17, Oct. 27, 1954, p. 1031-1034.

Studies on CaO activated by Pb, Mn, Pr, Sm, and Eu. 7 ref.

4532* Absorption of Ultrasound in Helium II. **O poglosh-chenii ul'trazvuka v gelii II.** (Russian.) R. G. Arkhipov. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 747-748.

Compares the work of Chase with that of Khalatnikov, and points out certain theoretical errors in the former's work. Graph. 3 ref.

4533* Quantum Theory of Magnetostriction of Ferromagnetic Monocrystals. **Kvantovaia teoriia magnitostriktsii ferromagnitnykh monokristallov.** (Russian.) A. A. Gusev. *Doklady Akademii Nauk SSSR*, v. 98, no. 5, Oct. 11, 1954, p. 749-752.

Constructs a step-by-step quantum-mechanical theory to explain the phenomenon with hexagonal and cubic lattice symmetry at low temperatures. 7 ref.

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Method using γ-radioactive isotopes; data for Zn in the temperature range from 554 to 904.2 C. Graphs, table, diagram. 7 ref.

4535* Investigation of the Magnetic Properties of Co-Zn and Mn-Zn Ferrites. **Issledovanie magnitnykh svoistv kobal't-tsinkovykh i margantsevo-tsinkovykh ferritov.** (Russian.) G. I. Dmitrakova. *Doklady Akademii Nauk SSSR*, v. 99, no. 1, Nov. 1, 1954, p. 45-46.

Verifies values of magnetic moments of mixed ferrites from −196 to 1000 C. Graphs.

4536* The Solution to a Special Heat Conduction Pro. and Its Application to Analogous Problem of Physics. **Die Lösung eines speziellen Wärmeleitungsproblems und ihre Anwendung auf analoge physikalische Probleme.** (German.) Eugen Tränkle. *Frequenz*, v. 8, no. 11, Nov. [illegible], p. 334-338.

One-dimensional heat conduction problem in a cylinder of infinite length. A simple approximation formula deduced from theoretical considerations can be applied to other processes. Graphs, diagrams, table.

4537* Description of a Spectral Analyzer for Studying the Scintillation Effect. **Description d'un analyseur spectral pour l'étude de l'effet de scintillation.** (French.) C. Manus, J. P. Borel, and R. Mercier. *Helvetica Physica Acta*, v. 27, no. 6, 1954, p. 497-502.

Describes apparatus for Fourier analysis of the scintillation effect in thin conductor plates. Diagram, graphs. 6 ref.

4538* Accidental Birefringences and Absolute Variations of Indices in Quartz. **Biréfringences accidentelles et variations absolues des indices dans le quartz.** (French.) B. Vittoz. *Helvetica Physica Acta*, v. 27, no. 6, 1954, p. 502-505.

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4539* Electron Conduction in Dielectric Crystals (Diamond and Silver Halogenides). **Conduction électronique dans les cristaux diélectriques (diamant et halogénures d'argent).** (French.) Ch. Allemand and J. Rossel. *Helvetica Physica Acta*, v. 27, no. 6, 1954, p. 519-546.

Behavior studied by crystal counter technique. Graphs, tables, diagram, photograph. 30 ref.

4540* **Raman Effect in Binary Liquid Mixtures. II.** B. R. Lakshmanan. *Indian Institute of Science, Journal*, v. 36, sec. A, Oct. 1954, p. 218-223 + 3 plates.

Describes results obtained from a study of the effect of concentration on the Raman spectra of three liquid mixtures, with pyridine common to all. Table. 7 ref.

4541 Thermal Diffusivity of Low Conductivity Materials. Paul K. Chung and Melbourne L. Jackson. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2563-2566.

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4542 Raman and Infrared Spectra of CF_3Br and CF_3I. Walter F. Edgell and Charles E. May. *Journal of Chemical Physics*, v. 22, Nov. 1954, p. 1808-1813.

Raman spectra at −100 and −40 C. Infra-red spectra at 30 and 160 C. Tables, spectra. 21 ref.

4543 Free-Electron Network Model for Conjugated Systems. V. Energies and Electron Distributions in the FE MO Model and in the LCAO MO Model. Klaus Ruedenberg. *Journal of Chemical Physics*, v. 22, Nov. 1954, p. 1878-1894.

Theories show close correspondence. Tables, graphs, diagrams. 10 ref.

4544 Magnetic Behavior of the System CoO—MgO at Elevated Temperature. Norman Elliott. *Journal of Chemical Physics*, v. 22, Nov. 1954, p. 1924-1925.

Tested from 296 to 500 K. Tables, graphs. 8 ref.

4545 Nuclear Magnetic Resonance Spectra and Structure of Borohydride Ion and Diborane. Richard A. Ogg, Jr. *Journal of Chemical Physics*, v. 22, Nov. 1954, p. 1933-1935.

Proton spectra presented at 30 and 40 Mc; B^{11} spectra at 6 Mc. Spectrograms.

4546* Theory of the Localizability of Corpuscles. **Théorie de la localisabilité des corpuscules. II.** Electron Levels of Atoms and Energies Associated With Cells. **Niveaux électroniques des atomes et énergies associées aux loges.** Hélène Brion, Raymond Daudel, and Simone Odiot. **III.** Addditional Remarks on the Geometric Significance of the Layer Idea. **Retour sur la signification géométrique de la notion de couche.** (French.) Siomne Odiot and Raymond

...del. *Journal de chimie physique*, v. 51, nos. 7-8, July-Aug. 1954, p. 358-362.

1 ref.

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The "structon" is defined and Na_2O-SiO_2 glass is studied on this basis. Graph. 17 ref.

4549* Nuclear Resonance and Movement of Molecules in Liquids. **Résonance nucléaire et mouvement des molécules dans les fluides.** (French.) E. M. Purcell. *Journal de physique et le radium*, v. 15, no. 12, Dec. 1954, p. 785-790.

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4550 The Characteristics of a Quartz-Fibre Electroscope. F. Harlen. *Journal of Scientific Instruments*, v. 31, Nov. 1954, p. 424-429.

Theory describing the mechanical restoring forces acting on a deflected fiber. Experimental deflection curves and the conducting coating of the fiber. Diagrams, graphs. 3 ref.

4551 Ferromagnetic Resonance in the Waves of a Multiple Spark Generator. K. A. Volkova. *National Science Foundation Translation, no.* NSF-tr-88, Oct. 1953, 4 p. (From *Doklady Akademiia Nauk SSSR*, v. 89, 1953, p. 655-658.)

Possibility of observing resonance using the mm. and cm. waves of the Glagoleva-Arkadyeva generator. Diagrams, resonance curves. 10 ref.

4552 The Electrical Conductivity of Cuprous Oxide. A. I. Andriyevsky, V. I. Voloshchenko, and M. T. Mishchenko. *National Science Foundation Translation, no.* NSF-tr-90, Oct. 1953, 3 p. (From *Doklady Akademiia Nauk SSSR*, v. 90, 1953, p. 521-523.)

Previously abstracted from original. See item 3158, v. 3, Mar. 1954.

4553 Kinetics of the Destruction of Superconductivity by a High Frequency Field. I. M. Lifshits and M. I. Kaganov. *National Science Foundation Translation, no* NSF-tr-91, Oct. 1953, 3 p. (From *Doklady Akademiia Nauk SSSR*, v. 90, 1953, p. 529-531.

Previously abstracted from original. See item 4072, v. 3, Mar. 1954.

4554 On the Properties of Single Cubic Zinc Sulfide Crystals. S. J. Czyzak, D. C. Reynolds, R. C. Allen, and C. C. Reynolds. *Optical Society of America, Journal*, v. 44, Nov. 1954, p. 864-867.

Crystal-growing methods. Optical and electrical properties. Photograph, diagrams, graphs, tables.

4555 A New Determination of the Emissivity of Tungsten Ribbon. J. C. De Vos. *Physica*, v. 20, no. 10, Oct. 1954, p. 690-714 + 1 plate.

Provides source of more reliable data for use of the W strip lamp as a standard source of radiation. Greater accuracy achieved with the results given as a function of wave length in the region 0.23 to 2.7μ at 1600 to 2800 K. Graphs, diagrams, tables. 31 ref.

4556* Thermodynamics of the Thomas-Fermi Atom at Low Temperature. J. J. Gilvarry. *Physical Review*, v. 96, ser. 2, Nov. 15, 1954, p. 934-943.

A general perturbation procedure for obtaining thermodynamic functions at low temperatures. Graphs, tables. 15 ref.

4557* Solution of the Temperature-Perturbed Thomas-Fermi Equation. J. J. Gilvarry. *Physical Review*, v. 96, ser. 2, Nov. 15, 1954, p. 944-948.

An analytical solution of the equation of nth order in terms of quadratures on the unperturbed solution corresponding to zero temperature. Graphs, tables. 8 ref.

4558 Optical Behaviours of Multi-Domain Single Crystal of $BaTiO_3$ in Dependence on Temperature. (English.) Tadao Horie, Kazuo Kawabe, and Shozo Sawada. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 823-825.

Data for tests at −70, 5, and 120 C. Photographs, graphs. 6 ref.

4559 The Effect of Intense Magnetic Fields on Electrolumineseent Powder Phosphors. A. N. Ince. *Physical Society, Proceedings*, v. 67, no. 420B, Dec. 1954, p. 870-874.

Significance of investigation in developing a theory of the mechanism involved. No quenching effect observed even for magnetic field intensities as high as 1.3 X 10^5 oersted. Diagrams, oscillograms. 11 ref.

4560 The Design and Operation of a Magnetic Refrigerator for Maintaining Temperatures Below 1°K. C. V. Heer, C. B. Barnes, and J. G. Daunt. *Review of Scientific Instruments*, v. 25, Nov. 1954, p. 1088-1098.

Includes graphs, diagrams, tables, photograph. 29 ref.

4561 Mass Spectroscopic Atomic Mass Differences. Henry E. Duckworth, Benjamin G. Hogg, and Edwin M. Pennington. *Reviews of Modern Physics*, v. 26, Oct. 1954, p. 463-472.

Doublet and bracket methods of mass comparison. Tables. 40 ref.

4562* Reports Presented at the Meeting on Infra-Red Study. **Communications présentées aux journées d'études sur l'infrarouge.** (French.) *Revue d'optique*, v. 33, no. 10, Oct. 1954, p. 489-520.

Nine reports on use of infra-red light. Infra-red lamps and other equipment. Spectroscopic and photometric applications. Graphs, drawings, photographs. 24 ref.

4563 On the Propagation of Elastic Waves in Aeolotropic Media. I. General Principles. II. Media of Hexagonal Symmetry. M. J. P. Musgrave. *Royal Society, Proceedings*, v. 226, ser. A, Nov. 23, 1954, p. 339-366.

Using the principle of least action the equations of motion and momentum conditions for elastic disturbances in any continuous medium are derived. Graphs, tables, diagrams. 8 ref.

4564 The Equations of Motion in the Non-Symmetric Unified Field Theory. W. B. Bonnor. *Royal Society, Proceedings*, v. 226, ser. A, Nov. 23, 1954, p. 366-377.

Field equations of the non-symmetric unified theory of gravitation and electromagnetism are changed so that they imply the existence of the Coulomb force between electric charges. 9 ref.

4565* The Lowest Absorption Coefficient of Interfering X-Rays. **Der kleinste Absorptionskoeffizient interferierender Röntgenstrahlung.** (German.) G. Borrmann. *Zeitschrift für Kristallographie*, v. 106, no. 2, Oct. 1954, p. 109-121.

Review of literature and mathematical treatise on the supernormal permeability of crystals to X-rays. Diagrams. 18 ref.

4566* Triboluminescence. Experiments for Explaining the Nature of Permanent and Temporary Triboluminescence. **Über die Tribolumineszenz. Versuche zur Aufklärung der Natur der permanenten und temporären Tribolumineszenz.** (German.) G. Wolff, I. Schönewald, and I. N. Stranski. *Zeitschrift für Kristallographie*, v. 106, no. 2, Oct. 1954, p. 146-171.

Determination of electrical charge carriers on fractures of triboluminescent substances. Diagram, table, graphs, photographs. 29 ref.

4567* On Schwinger's Functional in the Field Theory. **Über das Schwingersche Funktional in der Feldtheorie.** (German.) Kurt Symanzik. *Zeitschrift für Naturforschung*, v. 9a, no. 10, Oct. 1954, p. 809-824.

Mathematical explanation includes discussion and critical evaluation of the Tamm-Dancoff method. 41 ref.

4568* Strength and Plastic Properties of Acicular NaCl Crystals. **Festigkeits- und Plastizitätseigenschaften von NaCl-**

Physics

Nadelkristallen. (German.) Z. Gyulai. *Zeitschrift für Physik*, v. 138, nos. 3-4, 1954, p. 317-321.

Simple method of growing crystals and determining properties. Photographs, diagrams, photomicrographs. 2 ref.

4569* Determination of the Thickness and Optical Constants of "Thin" Layers. **Die Bestimmung von Schichtdicke und optischen Konstanten bei "dünnen" Schichten.** (German.) C. v. Fragstein. *Zeitschrift für Physik*, v. 139, no. 2, 1954, p. 163-174.

Mathematical method of describing relationship of electrical and magnetic field strengths on both sides of a thin metal deposit on glass traversed by light rays. Diagrams, tables, graphs. 5 ref.

4570* Application of Drude's Theory on Free Electrons to the Optical Behavior of Metals in the Visible and the Ultra-Violet Wave Range. **Zur Anwendung der Drudeschen Theorie der freien Elektronen auf das optische Verhalten der Metalle im Sichtbaren und Ultraviolett.** (German.) Günther Grass. *Zeitschrift für Physik*, v. 139, no. 3, 1954, p. 358-364.

Derivation of three approximations from Drude's dispersion formulas to facilitate comparison between theory and experiment. Graphs, tables. 8 ref.

4571* The Theory of Electrical Conductivity. **Zur Theorie der elektrischen Leitfähigkeit.** (German.) K. Ljolje. *Zeitschrift für Physik*, v. 139, no. 4, 1954, p. 388-401.

Utilizes every approximated wave function for metal electrons, without the use of spherically symmetrical energy surfaces. General solution; results calculated for alkali metals. Tables, diagram. 16 ref.

4572* Solution of Fok's Simplified Equation in the Two-Configuration Approximation for Atoms of the Beryllium Type. **Reshenie uproshchennykh uravnenii Foka v dvukhkonfiguratsionnom priblizhenii dlia atomov tipa berilliia.** (Russian.) A. P. Iutsis, V. V. Kibartas, and I. I. Glembotskii. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 27, no. 4, Oct. 1954, p. 425-430.

Method of simplification of Fok's equation is described to approximate values of the full energy for Be, B^{+}, and C^{++}. Theoretical and experimental data are compared. Tables. 7 ref.

4573* Resistance to Electric Breakdown of Metal Titanates of the Second Group of Mendeleev's Table Under Direct and Alternating (f=50 Cycles) Voltages. **Elektricheskaia prochnost' titanatov metallov II gruppy tablitsy D. I. Mendeleeva pri postoiannom i peremennom (f=50 Gts) napriazhenii.** (Russian.) V. I. Sarafanov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 27. no. 5, Nov. 1954, p. 590-594.

Experimentation with $MgTiO_3$, $ZnTiO_3$, $CaTiO_3$, $SiTiO_4$, $BaTiO_3$, and $BaO{\cdot}4TiO_2$; temperature dependence of voltage breakdown. Diagram, graph, tables. 4 ref.

4574* Resistance to Electric Breakdown of Metal Titanates of the Second Group of Mendeleev's Table Under High-Frequency Voltage. **Elektricheskaia prochnost' titanatov metallov II gruppy tablitsy D. I. Mendeleeva pri vysokochastotnom napriazhenii.** (Russian.) G. I. Skanavi and V. I. Sarafanov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 27, no. 5, Nov. 1954, p. 595-604.

Frequency and temperature dependence of resistance to electric breakdown at temperatures from 20 to 230 C. Hypothesis of thermoionization breakdown. Diagram, graphs, table. 5 ref.

4575* Temperature Dependence of Magnetic Properties of Nickel-Zinc and Copper-Zinc Ferrites. **Temperaturnaia zavisimost' magnitnykh svoistv nikel'-tsinkovykh i medno-tsinkovykh ferritov.** (Russian.) A. I. Suchkov. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1579-1583.

Includes graphs. 6 ref.

4576* Ferroelectric Properties of Solid Solutions of Barium Zirconate in Barium Titanate. **Segnetoelektricheskie svoistva tverdykh rastvorov tsirkonata bariia v titanate bariia.** (Russian.) G. A. Smolenskii, N. P. Tarutin, and N. P. Grudtsin. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1584-1593.

Includes tables, diagram, graphs. 7 ref.

4577* Composition of Slow Ions Formed in Passing a Beam of Positive Ions Through a Gas. **Sostav medlennykh ionov, obrazuiushchikhsia v gaze prio prokhozhdenii puchka polozhitel'nykh ionov.** (Russian.) N. V. Fedorenko. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 1950-1956.

Investigates the formation of ions of the inert gases. Graphs, diagram. 7 ref.

Books and Miscellaneous Publications

4578 Handbook of Elliptic Integrals for Engineers and Physicists. Paul F. Byrd and Morris D. Friedman. 355 p. 1954. Springer-Verlag, Berlin. (QA343 B99h)

A comprehensive table of over 3000 integrals, formulas, and numerical tables using Legendre's and Jacobi's notations.

4579 Symposia in Applied Mathematics. The American Mathematical Society, Proceedings. Albert E. Heins, editor. v. V. 169 p. 1954. McGraw-Hill, New York. (QA1 Sy68p)

Fifteen papers on the stability of fluid motions, hydrodynamic waves, diffraction and scattering problems, and the vibration theory.

4580 Calculus. A Modern Approach. Karl Menger. 2nd Ed. 304 p. 1953. Illinois Institute of Technology, Chicago. (QA303 M52c2)

Clarification of basic ideas and their application; presentation of a new theory of variable quantities.

4581 Structure of Molecules and Internal Rotation. San-Ichiro Mizushima. Physical Chemistry Monograph Series. 244 p. 1954. Academic Press, New York. (QD561 M69s)

Fundamental properties, applied theory, and experimental methods.

4582 Linear Equations in Applied Mechanics. H. F. P. Purday. 240 p. 1954. Interscience Publishers, New York. (QA372 P97L)

Harmonic functions; spherical harmonics; orthogonal functions; matrix algebra; scalar, vector, and tensor fields. Methods of solving problems in applied mechanics by numerical, mechanical, and electrical computation.

4583 The Microphysical World. William Wilson. 216 p. 1954. Philosophical Library, New York. (QC173 W69m)

A simplified presentation of the structure and behavior of atoms, protons, neutrons, and more minute objects, and how they participate in and contribute to the phenomena of heat, light, electro-magnetism, radioactivity, etc.

4584 Studies in Mathematics and Mechanics. Presented to Richard von Mises by Friends, Colleagues, and Pupils. 353 p. 1954. Academic Press, New York. (QA801 St94)

Includes 34 papers in English, four papers in French, three papers in Italian, and one paper in German on algebra and number theory; geometry; analysis; theoretical and applied mechanics; probability and statistics.

4585* **Table of the Natural Trigonometric Functions.** 315 p. 1954. International Business Machines Corporation, Endicott, New York. (QA55 In8t)

Presents the sines, cosines, and tangents of angles in radian measure, with a tabular increment of 0.0001 radian.

4586 Optical Image Evaluation. N. B. S. Circular 526. Proceedings of the National Bureau of Standards Semicentennial Symposium, Oct. 1951. 289 p. 1954. U. S. Government Printing Office, Washington, D. C. (QC381 Op7)

Twenty papers contributing to the field of geometric optics, optical systems, and instruments.

See also:

3304 (ferromagnetic properties of titanates)
3375 (spark spectra of Be-Cu alloys)
3477 (thermal properties of condensed gases)
3536 (electron configurations)
3568 (space and time considerations)

3768 (polarization of electromagnetic waves)
3818 (mass spectrometer)
3863 (calculation of heat transfer)
3909 (scientific progress)
4281 (bulk modulus determination)

PLASTICS

4587 Inhibition of Polymerization. I. Methyl Methacrylate. John L. Kice. *American Chemical Society, Journal,* v. 76, Dec. 20, 1954, p. 6274-6280.

Dilatometric study of effect of nine compounds on a 2,2′-azo-bis-isobutyronitrile-catalyzed polymerization. Tables, graphs. 24 ref.

4588 Side Chain Crystallization of *n*-Alkyl Polymethacrylates and Polyacrylates. Sidney A. Greenberg and Turner Alfrey. *American Chemical Society, Journal,* v. 76, Dec. 20, 1954, p. 6280-6285.

Dilatometric study of monomers with C_{12} to C_{18} *n*-alkyl chains. Tables, graphs. 16 ref.

4589 Reductive Amination of Ethylene/Carbon Monoxide Polyketones. A New Class of Polyamines. D. D. Coffman, H. H. Hoehn, and J. T. Maynard. *American Chemical Society, Journal,* v. 76, Dec. 20, 1954, p. 6394-6399.

Structures resemble long-chain hydrocarbons. Substances vary from liquids to waxy solids. Tables. 7 ref.

4590 The Synthesis and Polymerization of Ethylenesulfonic Acid. David S. Breslow and George E. Hulse. *American Chemical Society, Journal,* v. 76, Dec. 20, 1954, p. 6399-6401.

Made by saturating a solution of Na ethylene sulfonate with HCl. Polymerizes in water. 8 ref.

4591 Plastics Testing at High and Low Temperatures. C. H. Klute and Leonard B. McKee. *ASTM Bulletin,* 1954, no. 202, Dec., p. 50-55.

Equipment used to conduct a variety of mechanical tests on a 60,000-lb. universal testing machine in the −70 to +500 F range, and a low-temperature impact tester, usable from room temperature to −70 F. Tables, photographs, diagram. 4 ref.

4592 Polystyrene. *Canadian Chemical Processing,* v. 38, Dec. 1954, p. 32, 34, 36, 38.

Production and marketing in Canada, the new Dow plant at Sarnia. Photographs, flowsheet.

4593 Plastics in 1954. E. E. McSweeney and E. L. Kropa. *Chemical and Engineering News,* v. 33, Jan. 3, 1955, p. 16-19.

Most activity is in increasing production. Photograph.

4594* Copolymerization of Salts of Monomeric or Polymeric p-Vinyl Benzene Diazonium With Aromatic Phenols and Amines. **Sur la copulation des sels du p-vinylbenzènediazonium monomère ou polymère avec les phénols et les amines aromatiques. I.** Benzene Series. **Série benzénique.** (French.) Modeste Martynoff. *Comptes rendus,* v. 239, no. 22, Nov. 29, 1954, p. 1512-1514.

Includes graphs. 2 ref.

4595* Glass Fibre Reinforced Plastics in the Chemical Industry. I. Francis F. Jaray. *Engineer,* v. 198, Dec. 17, 1954, p. 839-842.

Materials and methods, used to counteract erosion and stress corrosion, high temperature effects, and increase mechanical strength with chemical resistance. Tables. (To be continued.)

4596* Use of Deuterium to Investigate Extent of Branching in Polystyrene. Leo A. Wall and D. W. Brown. *Journal of Polymer Science,* v. 14, Dec. 1954, p. 513-520.

Depends on lower activity of D; synthesis of α-deuterostyrene by reduction of acetophenone with $LiAlD_4$. Graph, table. 19 ref.

4597* Polymerization of Diallyl Phthalate. R. N. Haward. *Journal of Polymer Science,* v. 14, Dec. 1954, p. 535-545.

Study of a simple statistical model verifies recent experiments by Simpson. Diagrams. 9 ref.

4598* Effect of Molecular Weight Distribution on Gel Formation by High Energy Radiation. A. Charlesby. *Journal of Polymer Science,* v. 14, Dec. 1954, p. 547-553.

Significance of changes in mol. wt. Graph. 1 ref.

4599* Hungarian Experience in the Application of Polyvinylchloride. **Hazai tapasztalatok a polivinilklorid felhasználása terén.** (Hungarian.) Gyula Vancsó. *Magyar Kémikusok Lapja,* v. 9, no. 9, Sept. 1954, p. 257-265.

Mechanical and physical properties; chemical resistance; application as vessel coating; material for apparatus; tubing; plate; sealing materials. Diagrams, tables, photographs. 7 ref.

4600* The Initiation and Development of the Polymerization of the Acrylamides Under the Influence of Ultrasonic Waves. **Die Auslösung und der Verlauf der Polymerisation des Acrylamids unter dem Einfluss von Ultraschallwellen.** (German.) Arnim Henglein. *Makromolekulare Chemie,* v. 14, no. 1, 1954, p. 15-39.

Factors governing rate of polymerization and length of polymer chain; influence of solutions containing H or A; comparison of polymerizing and oxidizing effects of ultrasonic waves and γ-rays. Tables, graphs. 33 ref.

4601 Statistical Mechanics of Flexible Linear Polymers. I. Moments of End-to-End Distance of a Polymer. (English.) Nobuhiko Saitô. *Physical Society of Japan, Journal,* v. 9, no. 5, Sept.-Oct. 1954, p. 780-785.

A statistical mechanical theory using the pearl-necklace model. 6 ref.

4602 The Relation Between Dynamic Elastic Modulus, Internal Friction, Creep and Stress Relaxation in Polymethyl Methacrylate. (English.) Eiichi Fukada. *Physical Society of Japan, Journal,* v. 9, no. 5, Sept.-Oct. 1954, p. 786-789.

Includes graphs, diagram. 10 ref.

4603* Polyaddition Resins. **Polyadditionsharze.** (German.) Vladimir Šupler. *Plaste und Kautschuk,* v. 1, no. 10, Oct. 1954, p. 218-222.

The chemistry of epoxy resins and several important reactions. 22 ref.

4604* Plastics in the Cable Industry. **Kunststoffe in der Kabeltechnik.** (German.) W. Schröder. *Plaste und Kautschuk,* v. 1, no. 10, Oct. 1954, p. 228-232.

Literature review. Table. 40 ref.

4605* Developments in the Theory of Polymerization and of the Mechanical Properties of Polymer Solutions. **Ontwikkelingen in de theorie van de polymerisatie en van de mechanische eigenschappen van polymeeroplossingen.** (Dutch.) A. J. Staverman. *Plastica,* v. 7, no. 11, Nov. 1954, p. 556-558.

Kinetics of polymerization. Diagram. 12 ref.

4606 Tooling With Phenolic Casting Resins for Sheet Metal Pressing. F. L. Gilbert. *Plastics,* v. 19, Dec. 1954, p. 401-403.

Emphasizes technique of handling thermosetting plastics for tooling purposes. Photographs.

4607 Thermal Degradation of Polymers During Moulding. II. Experimental Study. H. L. Frisch, V. T. Stannett, S. Dalheim, and I. Sobolev. *Plastics,* v. 19, Dec. 1954, p. 411-412.

Extent of degradation both as a function of the number of molding cycles and cylinder temperature and the effect of these conditions on selected physical properties. Tables, graphs. 2 ref.

4608* Barrel Finishing Methods for Plastic Parts. E. C. Emslie. *Product Finishing,* v. 7, Oct. 1954, p. 65-68.

Deflashing process and polishing methods for parts and components. Photographs.

4609* Dicyano Diamide as Raw Material for Molding Powder. **Dwucyjanodwuamid jako surowiec dla tłoczyw. II.** (Polish.) M. Koziński and J. Brzeziński. *Przemysł chemiczny,* v. 10, no. 10, Oct. 1954, p. 528-531.

Equals properties of melamine powder and has much lower cost. Diagram, tables, graph. 5 ref.

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4610 The Synthesis of Block Copolymers in a Flow System. J. A. Hicks and H. W. Melville. *Royal Society, Proceedings*, v. 226, ser. A, Nov. 23, 1954, p. 314-335.

Methods and equipment. Photograph, diagrams, tables, graphs. 11 ref.

4611* Measurement of Creep of Acrylic Glazing Plastics Exposed to Temperature Gradients. Murray C. Slone and Frank W. Reinhart. *SPE Journal*, v. 10, Dec. 1954, p. 29-34, 50.

Testing program designed to evaluate the behavior of the materials at several mean temperatures, temperature gradients, and stresses. Photographs, diagrams, graphs, tables. 2 ref.

4612* Bag Molding. D. L. Ridenour. *SPE Journal*, v. 10, Dec. 1954, p. 35-39.

Outlines the methods for glass fiber reinforced unsaturated polyesters. Advantages of the process and construction of the molds. Diagrams. 2 ref.

4613* Furfural as Raw-Material for Synthesis of Intermediate Products for Plastic Masses. **Furfurol-syr'e dlia sinteza poluproduktov plasticheskikh mass.** (Russian.) V. I. Lutkova. *Uspekhi Khimii*, v. 23, no. 7, 1954, p. 821-830.

Typical reactions of furan and its derivatives, and their importance in the plastic industry. 67 ref.

4614* Investigation of Dielectric Losses by Low Frequency Relaxation in Polyethylene. **Issledovanie dielektricheskikh poter' nizkochastotnoi relaksatsii v polietilene.** (Russian.) G. P. Mikhailov, A. M. Lobanov, and B. I. Sazhin. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 9, Sept. 1954, p. 1553-1560.

Losses are related to orientation of polar groups in the crystalline phase. Graphs, tables. 13 ref.

4615* Elastic and Plastic Rupture of Amorphous Polymers. **Elasticheskii i plasticheskii razryvy amorfnykh polimerov.** (Russian.) G. M. Bartenev and G. I. Belostotskaia. *Zhurnal Teknicheskoi Fiziki*, v. 24, no. 10, Oct. 1954, p. 1773-1785.

Includes graphs, photographs. 17 ref.

4616* Special Characteristics of Deformation of Vinylplastics During Short-Time Tests. **Osobennosti deformirovaniia viniplasta pri kratkovremennykh ispytaniiakh.** (Russian.) N. T. Smotrin. *Zhurnal Tekhnicheskoi Fiziki*, v. 24, no. 11, Nov. 1954, p. 1991-1997.

Problems in determining the mechanical properties of plastics. Photographs, graphs, diagram. 4 ref.

Books and Miscellaneous Publications

4617 High Polymers. Mechanism of Polymer Reactions. G. M. Burnett. A Series of Monographs on the Chemistry, Physics, and Technology of High Polymeric Substances. v. III. 493 p. 1954. Interscience Publishers, New York. (QD281 B93m)

Presents the advances made with respect to addition radical, gas phase, homogeneous and heterogeneous liquid-phase, ionic, and condensation polymerization reactions, degradation, copolymerization, and kinetics.

See also:

3388 (end groups in polyamide resins)
3391 (styrene reactions)
3400 (methacrylic esters)
3402 (organotin compounds in plastics)
3415 (polymerization of dihydrofurans)
3426 (influence of alkalies on polymethylvinyl ketone)
3445 (condensation of phenol formaldehyde rensins)
3446 (synthesis of vinyl acetylene)
3552 (permeability of cellophane membranes)
3586 (vinyl acetate copolymers in paints)
3594 (vinyl as coating material)
3640 (plasticizers for lacquer resins)
3957 (swelling of polymer films)
3980 (plastics in bearings)

POLLUTION AND WASTES

4618 Smog Control in the Foundry. Harry Dok. *American Foundryman*, v. 26, Dec. 1954, p. 46-49.

Collection of smoke, fumes, and dust in an electric steel foundry. Photographs, diagram.

4619 Colorimetric Microdetermination of Nitrogen Dioxide in the Atmosphere. Bernard E. Saltzman. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1949-1955.

Reagent of sulfanilic acid, *N*-(1-naphthyl)-ethylenediamine, dihydrochloride, and acetic acid detects less than 1 p.p.m. Diagram, tables. 25 ref.

4620 Traces Pollution Patterns. *Chemical Engineering*, v. 62, Jan. 1955, p. 112, 114.

Fluorescent zinc cadmium sulfide (1 to 2μ size range) is used in Los Angeles. Photographs.

4621* Air Pollution. *Colliery Guardian*, v. 189, Dec. 2, 1954, p. 703-705.

Nature, causes, and effects of industrial smoke, grit, dust, and S pollution problems in Great Britain. Tables. (To be continued.)

4622* Elimination of Industrial Smoke by Ultrasonics. **Industrierauchbeseitigung durch Ultrabeschallung.** (German.) W. Müller. *Energietechnik*, v. 4, no. 10, Oct. 1954, p. 431-432.

Brief description of principle and research on ultrasonic dust precipitators. 9 ref.

4623* Cyclone Dust Remover. **Zyklonentstauber.** (German.) J. Dobreff, H. Effenberger, and S. Dauer. *Energietechnik*, v. 4, no. 10, Oct. 1954, p. 433-437.

Theoretical treatise on degree of efficiency and description of different types of dust removers. Diagrams, table, graph. 15 ref.

4624* Water Supply and Waste-Water Treatment in Gas Plants. **Wasserversorgung und Abwasserbehandlung in Gaswerken.** (German.) R. Neef. *Energietechnik*, v. 4, no. 10, Oct. 1954, p. 444-448.

Numerous suggestions on reducing the water consumption of gas plants. Tables, diagrams.

4625 A Review of Current Research Work on the Treatment and Disposal of Liquor Effluents From Gas Works. A. L. Roberts and W. H. Blackburn. *Gas Council, Research Communication* GC18, Nov. 1954, 14 p. (TP700 G21.2r)

Reports nine schemes for treatment. 7 ref.

4626 Artificial Surface Dirts for Detergency Studies With Painted Surfaces. Wesley E. Shelberg, James L. Mackin, and Ross K. Fuller. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2572-2579.

Reviews urban and shipboard dirts, their synthetic replicas, and detergent removal efficiencies. Photographs, diagrams, tables, graph. 19 ref.

4627 Atmospheric Pollution. Louis C. McCabe. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 93A-94A.

Significance of organic acids in air pollution and effects on vegetation. Table, graphs. 8 ref.

4628 Plant Engineering Memos. Joseph T. Melichar. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 109A-110A.

Describes a profitable solvent recovery system. Photographs.

4629* Waste Disposal Problems and Solutions. Thomas J. Powers. *Paint Industry Magazine*, v. 69, Dec. 1954, p. 46-48; disc., p. 48.

A general discussion. Table.

4630* Streams and Specialty Mill Effluents. Hayse Black. *Paper Trade Journal*, v. 138, Dec. 3, 1954, p. 18, 20, 22, 24.

Stream pollution control in Ohio, third state in number of paper mills.

4631* Flow of Smoke From Chimneys in Level Terrain. **Rauchströmung aus Schloten in ebenem Gelände.** (German.) R. Ibing. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 32, Nov. 11, 1954, p. 1085-1090.

Factors which influence flow and dispersion of smoke; model experiments indicate most suitable orientation of smoke-emitting power plants with respect to predominant wind conditions and optimun height of chimneys. Photographs, diagrams. 3 ref.

RUBBER AND ELASTOMERS

4632 Analysis of Polybutadienes and Butadiene-Styrene Copolymers by Infrared Spectroscopy. John L. Binder. *Analytical Chemistry*, v. 26, Dec. 1954, p. 1877-1882.

Micro-structures and polymerization variables can be determined. Tables, graphs. 12 ref.

4633 Rubber Hose Gets Better. J. A. Muller. *Chemical Engineering*, v. 62, Jan. 1955, p. 224, 226, 228, 230.

New uses found for better, tougher hose. Photographs.

4634 Rubber in 1954. John T. Cox, Jr. *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 107-108.

Government plants sold to industry; 1954 market declined.

4635 Rubber Structure and Elasticity. P. J. Flory. *India-Rubber Journal*, v. 127, Dec. 4, 1954, p. 7-10.

Early history; structure of vulcanized rubber; theory of elasticity. Diagram.

4636 Mechanism of Formation of Cream in GR-S Latex. L. H. Howland and Alfred Nisonoff. *Industrial and Engineering Chemistry*, v. 46, Dec. 1954, p. 2580-2586.

Undesirable cream can be controlled by soap addition; other aspects discussed. Tables, micrographs, graph. 5 ref.

4637 Chemorheology of Some Specially Prepared Silicone Rubbers. D. H. Johnson, J. R. McLoughlin, and A. V. Tobolsky. *Journal of Physical Chemistry*, v. 58, Dec. 1954, p. 1073-1075.

Extremely labile rubbers from octamethylcyclotetrasiloxane. Diagram, graph. 4 ref.

4638* How to Treat Tensile Data of Rubber. III. Least Squares Adjustment. Shigeo Kase. *Journal of Polymer Science*, v. 14, Dec. 1954, p. 579-582.

An alternate method. Table. 3 ref.

4639* Effect of Activated Silica in Nitrile-Rubber Vulcanizates. **Wirkung aktiver Kieselsäuren in Nitrilkautschuk-Vulkanisaten. II.** (German.) Paul Kluckow. *Kautschuk und Gummi*, v. 7, no. 11, Nov. 1954, p. 256WT-258WT.

Effect of dibenzyl ether and triacetin on the physical properties of three different rubbers with different silica fillers. Table.

4640* Hypalon, Chlorosulfonated Polyethylene. Properties, Mixing, and Processing. **Hypalon, chlorsulfoniertes Polyäthylen. Eigenschaften, Mischen und Verarbeiten.** (German.) *Kautschuk und Gummi*, v. 7, no. 11, Nov. 1954, p. 259WT-262WT.

Methods of processing Hypalon mixtures and properties of vulcanized Hypalon. Graph, tables.

4641* Structure of Gels. **Stroenie studnei. VI.** Production of Gels and Globular Structures From Rubber by Method of Vulcanizing Solutions. **Poluchenie studnei i globuliarnykh struktur iz kauchukov metodom vulkanizatsii rastvorov.** (Russian.) P. I. Zubov, Z. N. Zhurkina, and V. A. Kargin. *Kolloidnyi Zhurnal*, v. 16, no. 5, Sept.-Oct. 1954, p. 345-349.

Mechanical properties and the effect of S_2Cl_2 on natural and synthetic rubber gels. Graphs, diagram. 2 ref.

4642* Influence of Natural Rubber Oxidation on the Kinetics of Swelling. **Vliianie okisleniia kauchukov na kinetiku ikh nabukhaniia.** (Russian.) V. E. Gul', I. V. Khodzhaeva, and B. A. Dogadkin. *Kolloidnyi Zhurnal*, v. 16, no. 6, Nov.-Dec. 1954, p. 412-420.

The oxidation process and its relation to structural characteristics. Tables, graphs. 3 ref.

4643* Weight Change of Rubber in Solvents. **A gumi súlyváltozása oldószerkben.** (Hungarian.) Klára Csurgay and Barna Zoltán Sólyom. *Magyar Kémiai Folyóirat*, v. 60, no. 9, Sept. 1954, p. 264-267.

Problem of increase in vol. and wt. of vulcanizates of Perbunan 85, Müszaki Gumigyár, and mixtures of buna S_8 and natural rubber. Proposes a quotient for the determination of the swelling properties of the material. Tables, graphs.

4644 On the Abrasion of Rubber. A. Schallamach. *Physical Society, Proceedings*, v. 67, no. 420B, Dec. 1954, p. 883-891 + 2 plates.

Expressions for the dependence of abrasion on normal load and on nature of abrasive are deduced and compared with experimental results. Graphs, tables, micrographs, stress pattern. 11 ref.

4645 Development of a Formula for the Preparation of 75/25 Butadiene-Styrene Copolymer, Polybutadiene, and Polyisoprene at Minus 20°F. M. H. Reich, B. Moss, and J. M. Gyenge. *Rubber Age*, v. 76, Dec. 1954, p. 391-395.

Procedure outline and formula for 0 and −20 F polymerization temperatures and resulting physical properties. Tables, graphs. 5 ref.

4646 Relaxed Compression Set—A Definitive Property of Vulcanizates. L. R. Sperberg. *Rubber Age*, v. 76, Dec. 1954, p. 401-412.

Introduces a new tool which makes it possible to describe vulcanization in terms of numbers independent of type of elastomer, vulcanization ingredients, accelerator type, time or temperature of curve, or any other factor affecting vulcanization. Graphs, tables, photograph. 5 ref.

4647* The Effect of Masterbatching, Compounding, and Testing Variables on Constant-Slip Abrasion Results. L. H. Howland, W. W. White, and W. E. Messer. *Rubber Chemistry and Technology*, v. 27, Oct.-Dec. 1954, p. 977-995.

Results from Lambourn abrasion tests in a constant temperature cabinet from −10 to 40 C. Tables, graphs, micrographs, diagram. 5 ref.

4648* Temperatures of Glaze Formation and Consistency of Natural Rubbers of Different Molecular Weights. **Temperatury zasteklovaniia i tekuchesti natural'nykh kauchukov razlichnogo molekuliarnogo vesa.** (Russian.) A. Tager, M. Iovleva, T. Kantor, and L. Muzheva. *Zhurnal Prikladnoi Khimii*, v. 27, no. 11, Nov. 1954, p. 1227-1230.

Temperature of the glaze point not affected, but the flow temperature is higher with increasing molecular weights. Graphs, table. 3 ref.

See also:
3422 (synthesis of fluorodienes)
3611 (neoprene for coatings)
4703 (sorption of polystyrene latex on paper)

SPACE HEATING AND CONDITIONING

4649 Gas-Fired Panel Units for Infra-Red Heating. *Canadian Chemical Processing*, v. 38, Dec. 1954, p. 40, 42, 44.

Flexibility of design; paint drying ovens. Photographs.

4650* Radiant Heating. Temperature Limits of the Ceiling and Raised Panels. **Chauffage par rayonnement. Température limite du plafond et des panneaux en élévation.** (French.) A. Missenard. *Chaleur & Industrie*, v. 35, no. 352, Nov. 1954, p. 333-348.

General study of radiant heating from ceiling and raised panels. Physiological considerations; influence of shape of ceiling. Graphs, diagrams, table. 7 ref.

4651 Construction of a Gas Refrigerating Machine. J. W. L. Köhler and C. O. Jonkers. *Philips Technical Review*, v. 16, Oct. 1954, p. 105-115.

The application of a gas refrigeration cycle, and a practical machine for its realization together with its performance record. Graph, diagrams, photographs, table. 2 ref.

Space Heating and Conditioning

Books and Miscellaneous Publications

4652 Pairs of Operating Substances (Cooling and Absorbing Agents) for Absorption Cooling Plants and Absorption Refrigerators. **Arbeitsstoffpaare (Arbeitsmittel und Absorptionsmittel) für Absorptions-Kälteanlagen und Absorptions-Kühlschränke.** (German.) Wilhelm Niebergall. 269 p. 1949. Verlag für Fachliteratur Rich. Markewitz, Mühlhausen. (TP492 N55a)

Principles of refrigeration by absorption; data and constitution diagrams of binary mixtures; thermodynamic and economic comparisons.

See also:
3264 (solar heating)
3687 (heating system corrosion)
3886 (oil vs. coke for space heating)

TEXTILES AND FIBERS

4653* **Application of the Silicone Resins to Textile Fabrics.** Fred Fortess. *American Association for Textile Technology, Papers,* v. 10, Dec. 1954, p. 20-28; disc., p. 29-32.

Chemical nature of the resins and requirements for application; commercially available silicones; preparation of finish emulsions and optimum methods of application and curing; fabric properties influenced by silicones. Micrographs, tables, photographs.

4654* **An Investigation of the Properties of Cyanoethylated Cotton.** *American Dyestuff Reporter,* v. 43, Nov. 22, 1954, p. P774-P779.

Chemistry of cyanoethylation; effects on dyes. Tables. 19 ref.

4655* **Alphabetical List of New Products Developed Since November, 1953.** *American Dyestuff Reporter,* v. 43, Dec. 6, 1954, p. 805-836.

Includes data on coloring materials, chemicals, and equipment used in the textile industry. Photographs.

4656 Textiles in 1954. Milton Harris and John Krasny. *Chemical and Engineering News,* v. 33, Jan. 10, 1955, p. 117-118.

Field showed improvement after several diversifying mergers. Fiber research still strong.

4657 A Study of the Shape, Surface Structure and Frictional Wear of Fibres by Reflexion Electron Microscopy. J. A. Chapman and J. W. Menter. *Royal Society, Proceedings,* v. 226, ser. A, Nov. 23, 1954, p. 400-407 + 4 plates.

Study of the shape and surface structure of small fibers of orlon, viscose rayon, cellulose acetate, glass wool, and nylon. Diagram, micrograph. 13 ref.

Books and Miscellaneous Publications

4658 Matthews' Textile Fibers. Herbert R. Mauersberger, editor. 6th Ed. 1283 p. 1954. John Wiley & Sons, New York. (TS1540 M43t6)

Treats all fibers of the animal, plant, mineral, and synthetic kingdoms from the point of view of their detailed physical, chemical, and related properties.

4659 Review of Textile Progress-1952. v. IV. 560 p. 1953. The Textile Institute, Manchester, England. (TS1449 R32).

Physical testing, chemistry, fabrication, production, dyeing, printing, cleaning, and industrial applications.

WELDING AND JOINING

4660 Spot Welds Work Well in Titanium. M. L. Begeman and Frank W. McBee, Jr. *American Machinist,* v. 98, Dec. 20, 1954, p. 98-100.

Conditions for producing sound welds; mechanical properties of joints. Graphs, photographs. 16 ref.

4661 How to Braze Carbide-Tipped Tools. *American Machinist,* v. 98, Dec. 20, 1954, p. 123.

Detailed steps for various grades and applications.

4662* **Australian Trends in Pressure Vessel Construction.** W. Bernard. *Australasian Engineer,* 1954, Oct., p. 60-64.

Recent welding and cutting techniques; inspection; materials; construction faults. Photographs, diagrams.

4663* **Faults in Welds: Causes and Cures.** W. S. Coates. *Australasian Engineer,* 1954, Oct., p. 83-84.

Discussion on where faults occur and how they could be eliminated and rectified.

4664 Mechanized Welding. *Automobile Engineer,* v. 44, Dec. 1954, p. 561-565.

Development of equipment for mechanized application of the consumable electrode and W electrode processes. Photographs, diagrams, tables.

4665 Welding Research. *Automobile Engineer,* v. 44, Dec. 1954, p. 569-574.

Metallurgical aspects of the British Welding Research Association on ferrous and non-ferrous metals. Photographs, diagrams, micrographs. 13 ref.

4666 Welding of Carbon Steels by the Argonaut Process. H. F. Tremlett and A. W. Stones. *British Welding Journal,* v. 1, Dec. 1954, p. 541-548.

Investigates the production of welds free from porosity, and strong enough for joining high-quality killed and semi-killed mild steels. Photographs, tables, micrograph.

4667 Fusion Welding of Aluminium Alloys. V. A Mathematical Examination of the Effect of Bounding Planes on the Temperature Distribution Due to Welding. Doris K. Roberts and A. A. Wells. *British Welding Journal,* v. 1, Dec. 1954, p. 553-560.

Using the principle of image sources and a numerical method, it is shown that a weld test plate should have a half-width of not less than ten melted widths to give a reasonable approximation to the thermal conditions in an infinite plate. Graphs, table, diagram. 4 ref.

4668 Soft Soldering Is Still Growing in Fabrication Usage. E. A. Lancaster. *Canadian Metals,* v. 17, Dec. 1954, p. 43-44, 46.

Properties and uses of Sn-Pb solders. Diagrams, micrographs. (To be continued)

4669 Cold Welding Process. W. A. Barnes. *Electrical Manufacturing,* v. 54, Dec. 1954, p. 94-97.

Technique in which high unit pressures produce a very critical interflow of metal across clean interfaces. Applications for electrical and electronic parts. Photographs.

4670 Investigation of Surface Tension in Metal-Bonding Processes. R. L. Rosano and G. Diehl. *Engineer's Digest,* v. 15, Nov. 1954, p. 469-473. (From *La Recherche Aéronautique,* 1954, no. 40, July-Aug., p. 41-49.)

Previously abstracted from original.

4671* Processes for Checking Welded Structures. **Procedimientos de control de las estructuras soldadas. II.** (Spanish.) Guillermo Salazar Polanco. *Fusion de Metales,* v. 16, no. 6, Nov.-Dec. 1954, p. 12-16.

Discusses workmanship and tests for qualifying workers; shrinkage; heating processes for decreasing stresses. Diagrams. (To be continued.)

4672* **Improved Welding Techniques Produce Lighter, Stronger Chain.** Harry F. Reid. *Industry & Welding,* v. 28, Jan. 1955, p. 33-35, 68.

Brief summary of the major and minor welding techniques in chain making. Photographs.

4673* **Production Brazing Aluminum.** Charles A. McFadden. *Industry & Welding,* v. 28, Jan. 1955, p. 50-52, 56-47.

New process for joining Al sheathed Nichrome coils to appliances, and its application in the aircraft industry. Photographs.

4674* Welding Research for Higher Efficiency, Lower Costs. Orville T. Barnett. *Industry & Welding*, v. 28, Jan. 1955, p. 58, 60-63.

Fundamental and practical projects at Armour Research Foundation include work with recrystallization welding of Al; arc and resistance welding of various metals. Photograph.

4675 Punched Lugs Provide Rapid, Simple, Inexpensive Joining Method. Federico Strasser. *Iron Age*, v. 174, Dec. 2, 1954, p. 122-123.

Folding and bending is satisfactory for many sheet metal joints. Diagrams.

4676 Consumable Electrode Arc Welding of Magnesium. Paul Klain. *Light Metal Age*, v. 11, Dec. 1954, p. 14-17.

Method promises faster welding and lower costs. Photographs, table.

4677* The Welding of Copper and Its Alloys. **Das Schweissen von Kupfer und seinen Legierungen.** (German.) H. A. Horn. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 869-873.

Different methods of welding Cu and Cu alloys. Typical applications. Photographs, micrographs. 14 ref.

4678 A German View of Brittle Welded Structures. Edouard Houdremont. *Metal Progress*, v. 67, Jan. 1955, p. 114-120, 200, 202.

Reviews the causes of brittleness in steels; annealing of weldments. Graphs, micrographs, tables.

4679 Advances in Welding in Britain. E. Bishop. *Metal Progress*, v. 67, Jan. 1955, p. 121-125.

New concepts in the design of welded structures; improvement of weldability of high-tensile steels; electrodes that give crack-free deposits; a stitch welder having double the usual welding speed; use of twin-cored electrodes to speed manual arc welding. Photographs.

4680 Successful Manufacture and Use of All-Austenitic Welding Electrodes. Egon Kauhausen and H. A. Vogels. *Metal Progress*, v. 67, Jan. 1955, p. 129-136.

Evidence that cracks of all kinds in austenitic welds are due to grain-boundary inclusions. Tables, photographs, micrographs, graphs.

4681* Modern High-Performance Electrodes. **Les Electrodes modernes à hautes performances.** (French.) R. J. Mouton. *Ossature métallique*, v. 19, no. 11, Nov. 1954, p. 555-562.

Development, definition, and applications. Tables, graph.

4682* Welding in Passenger Rolling Stock. **La soudure dans le matériel roulant à voyageurs.** (French.) M. W. Kerkhofs. *Revue de la soudure (Brussels)*, v. 10, no. 3, 1954, p. 123-132.

Studies spot welding of stainless steel in railroad coaches and streetcars. Photographs, diagrams.

4683* A Process of Welding Joints Between Rails and Austenitic Manganese Steel Rail Fixtures. **Un procédé de soudure des joints entre rails et appareils de voie en acier austénitique au manganèse.** (French.) Ch. Hanappe. *Revue de la soudure (Brussels)*, v. 10, no. 3, 1954, p. 133-135.

Use of vertical plates between rail ends. Fatigue strength of joints. Diagrams, micrographs, tables.

4684* Use of Oxyacetylene Flame in Connection With Various Welding Processes. **L'utilisation de la flamme oxy-acétylénique associée aux divers procédés de soudage.** (French.) M. Evrard and H. Granjon. *Revue de la soudure (Brussels)*, v. 10, no. 3, 1954, p. 136-150.

Grain refinement; degasification; reduction of residual stresses; descaling of and removal of rust from thin pieces before spot welding. Micrographs, tables, diagrams, photographs.

4685* Development and Applications of Resistance Butt Welding. **Entwicklung und praktische Anwendungsmöglichkeiten der Widerstand-Stumpfschweissung.** (German.) Heinz Neumann. *Schweissen und Schneiden*, v. 6, no. 11, Nov. 1954, p. 439-447.

Differences and applications of flash and pressure butt welding, with possibilities of mechanizing the former. Graphs, diagrams, photographs, spectrograph.

4686 The Influence of "Joint Design" on "Solderability". G. L. J. Bailey. *Sheet Metal Industries*, v. 32, no. 333, Jan. 1955, p. 47-57; disc., p. 57.

Nature of relationship; evaluation of effects of prior roughening, alloy formation, and precipitation from the flux on the value of the contact angle. Graphs, table, diagrams, micrographs. 3 ref.

4687* The Effect of Nitrogen in Electric Arc Welds. **Die Wirkung des Stickstoffes in Lichtbogenschweissen.** (German.) Werner Hummitzsch. *Stahl und Eisen*, v. 74, no. 26, Dec. 16, 1954, p. 1723-1730.

Behavior of N in molten and solid weld metal; effects on mechanical properties. Tables, photographs, graphs, micrographs. 20 ref.

4688* Bare Wire to "Coilex". D. B. J. Thomas. *Welder*, v. 23, July-Sept. 1954, p. 182-186.

Review of progress from the use of bare wire to the development and applications of a new continuous extruded electrode for automatic arc welding. Photographs, tables.

4689 How Design Control Can Save You Money. Rex Cleveland. *Welding Engineer*, v. 39, Dec. 1954, p. 24-27.

Precautions and requirements for designing satisfactory welded structures. Diagrams, tables.

4690 Here's How to End Porous Welds. Helmut Thielsch. *Welding Engineer*, v. 39, Dec. 1954, p. 33-35.

Causes and remedies. Photographs. 3 ref.

4691 Procedure Control as Applied to Automatic Welding Processes. Warner H. Simon. *Welding Journal*, v. 33, Dec. 1954, p. 1149-1161.

Review of developments and procedure controls to aid in economical and quality production. Graphs, table, photographs. 32 ref.

4692 Flash Welding Aluminum to Copper Tubing. W. F. Haessly. *Welding Journal*, v. 33, Dec. 1954, p. 1162-1170.

Procedures for production welding to meet stringent requirements. Diagrams, photographs, micrographs, table.

4693 The Production of Welded Stainless Steel Pipe. A. Grodner. *Welding Journal*, v. 33, Dec. 1954, p. 1171-1174.

Production welding procedures, radiographic inspection, and heat treatments. Diagrams, photographs.

4694 Welded TV Tower. Robert A. Vaughn. *Welding Journal*, v. 33, Dec. 1954, p. 1175-1178.

High speed manual shop arc welding in precision jigs simplified erection problems. Diagrams, photographs.

4695 Repairing Castings From Coast to Coast. W. H. Lane. *Welding Journal*, v. 33, Dec. 1954, p. 1179-1184.

Experiences of a company specializing in the repair of cracked and broken cast iron. Photographs.

4696 Induction Brazing for Quantity Production. D. Warburton Brown. *Welding and Metal Fabrication*, v. 22, Dec. 1954, p. 460-464.

Equipment and techniques used in mass production installations. Diagrams, photographs, tables.

4697* Silver Brazing Titanium Requires Inert Gas Shield; Gives High Joint Strength. Nathan A. Tiner. *Western Metals*, v. 12, Dec. 1954, p. 70-72.

Equipment; techniques; structures of joints. Graph, micrographs, photograph.

Books and Miscellaneous Publications

4698 Welding for Engineers. Harry Udin, Edward R. Funk, and John Wulff. 430 p. 1954. John Wiley & Sons, New York. (TS227 Ud5w)

Fundamental principles of the art and science of welding.

4699 The Effect of Temperature on the Strength of Wood, Plywood and Glued Joints. P. H. Sulzberger. Commonwealth of Australia, Dept. of Supply, Aeronautical Re-

Welding and Joining

search Consultative Committee, Report ACA-46, Dec. 1953, 44 p. (TL529 Au78.1r)

Includes photographs, tables, graphs. 20 ref.

See also:
4302 (welding of Ti)

WOOD AND FOREST PRODUCTS

4700 Wood Chemistry Research at the Ontario Research Foundation. I. H. Borden Marshall. *Canadian Chemical Processing*, v. 38, Dec. 1954, p. 92-95.

Economic utilization sought. Photographs. 4 ref.

4701 Semi-Chemical Pulp. *Chemical Engineering*, v. 62, Jan. 1955, p. 300-303.

A pictured flowsheet of pulp for boxboard corrugating stock.

4702 Pulp and Paper in 1954. Robert B. Hobbs and Williams K. Wilson. *Chemical and Engineering News*, v. 33, Jan. 10, 1955, p. 114-116.

Market position maintained; 1955 market for expansion. Graphs.

4703* Sorption of Polystyrene Latex Particles on Paper. **Sorbtsiia chastits lateksa polistirola na bumage.** (Russian.) E. M. Aleksandrova and P. V. Mochalov. *Kolloidnyi Zhurnal*, v. 16, no. 6, Nov.-Dec. 1954, p. 401-405.

The role of electrolyte in the process; experimental results. Tables, graphs. 5 ref.

4704 The Decay of Timber and Its Prevention. W. A. Edwards. *Oil & Colour Chemists' Association, Journal*, v. 37, Dec. 1954, p. 655-665.

Describes some fungi and insects, their environment, and techniques for their control. Tables, photographs.

4705* Heat Balance in the Kraft Mills. H. T. Baker. *Paper Mill News*, v. 77, Dec. 4, 1954, p. 60 + 4 pages.

Limited to Kraft pulping only.

4706* The Modern Paper-Making Machine Applied to the Utilization of Short-Fibered Materials. Ralph C. Heys. *Paper Trade Journal*, v. 138, Dec. 3, 1954, p. 14-17.

Survey of progress in application to semi-chemical pulps. Diagrams.

4707* Introduction of Stress Into a Paper Sheet During Drying. Bertil W. Ivarsson. *Tappi*, v. 37, Dec. 1954, p. 634-639.

Thermodynamics and determination of swelling stresses; application to drying stresses; effect of drying stress on stress-strain curves of paper. Graphs, tables, diagram. 11 ref.

Books and Miscellaneous Publications

4708 Anatomy of Common North American Pulpwood Barks. Ying-Pe Chang. Tappi Monograph Series-No. 14. 240 p. 1954. Technical Association of Pulp and Paper Industry, New York. (QD648 T22a)

Information on 20 common barks obtained by research at the U. S. Forest Products Laboratory, Madison, Wis. under a TAPPI research grant.

4709 Forrest Products Research and Industries in the United States. W. W. Varossieau. 796 p. 1954. J. M. Meulenhoff, Amsterdam. (TS820 V43f)

With the forest products industries in Europe facing a severe timber shortage, the author has made a comprehensive study of the nation's methods, by visiting forestry operations, industries, and research laboratories.

See also:
3333 (recovery unit for alkaline pulping)
3389 (oxidation of lignin)
4699 (wood, plywood, and glued joints)